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A New Alternating Machine.

A new type of Thomson-Houston alternating current dynamo is shown in the accompanying illustration. The dynamo is made in two sizes of 750 and 1,300 lights capacity. A special point in favor of this type is the splitting of the fields allowing easy access to all parts, and the armature is perfectly ventilated, obviating all tendency to burn out. The dynamo is entirely automatic in operation, and will permit the throwing on or off of any number of lamps from one to the total capacity, without causing any sparking at the dynamo, or changing the candle power of the lamps remaining in circuit.

Electric Lights in Shafts.

A despatch from Ironwood, Mich., says: "The decision of the Norrie, Pabst and other leading mines of this city to light their mines with electricity is viewed with interest by mining men. On the Marquette and Menominee ranges the surface workings of many of the principal mines are lighted by electricity, but the underground slopes are still lighted by the kerosene lamps and candles of the miners. The illumination is of course very imperfect, and there can be no question that with a better light the men whose duty it is to test the walls and roofs to see that they are solid, and protect the miners from the dreaded falling of rock, could work to much better advantage than now. The old-fashioned miners think that the introduction of electric light, which will illuminate all parts of the mine, will scare the men, as it will show them the great masses of rock that they otherwise would not see. The miners may be scared for a few days, but they will become used to the electric light as they have to the power drills and dynamite that have been introduced into all the principal mines of the country, within the past ten years. The Norrie mine maintains the lead on ore shipments. Its production will certainly exceed 500,000 tons this year, but by how much cannot be said."

Street Car Power.

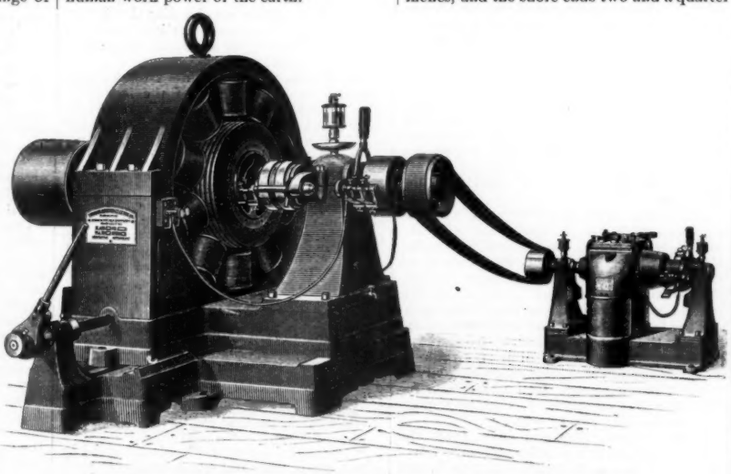
The Buffalo *Times* of recent date thus laments on the fate of the city in the matter of rapid transit:

The importance of more effective power in street car service is being demonstrated during the present fair. The over-burdened horses, struggling up Main street with cars crowded by a hundred passengers each, make a pitying sight. It is absolutely cruelty to animals, and the society for their protection would be justified in interfering for their relief.

The matter seems more aggravating from the fact that there is no necessity for it. A better power has been amply demonstrated and should have been adopted in Buffalo long ago. Electricity is being used elsewhere with success, while this city still adheres to the old system of animal power. The Philadelphia papers bring us an account of a successful test of a road storage battery that will move not only one, but three or four cars. What a relief this would be at such an emergency as the present, both to the animals and the company, as well as passengers.

The Power of the World.

An interesting calculation has recently been made by the Statistical Bureau in Berlin. Four-fifths of the power machines at present in activity in the world have been erected during the last 25 years. The country which possesses the highest amount of horse-power is the United States, with 7,500,000 horse-power; then follow England, with 7,000,000; Germany with 4,500,000; France, with 3,000,000, and Austro-Hungary, with 1,500,000. These figures do not include locomotives, of which there are 105,000 at work, with a total horse-power of 3,000,000. Thus the total horse-power in the world is 46,000,000. A steam "horse-power" is equivalent to three actual horses' strength, and each living horse respresents the strength of seven men. Thus the total horse-power of the entire world represents the work of 1,000,000,000 men, or more than twice the total working population of the earth. Steam has thus tripled the entire human work power of the earth.



THE THOMSON-HOUSTON ALTERNATING CURRENT DYNAMO, NEW TYPE.

Electric Work at Plattsmouth, Neb.

All last summer a force of from 50 to 100 men were engaged in the erection at Plattsmouth, Neb., of what is claimed to be the most complete electrical plant in the State. The work already done includes the construction of two miles and a half of electric street railways, the distribution of electric wires over the town ready to furnish incandescent or arc lights in any number, or power, and the erection of a large brick factory and power building in which are five dynamos to furnish power in the manufacture of incandescent electric lamps, besides the dynamos for lighting and giving power to the city, and the material and necessary utensils are at hand to start the factory to work.

Telegraph Litigation.

The case of the Great Northwestern Telegraph Company against the Montreal Telegraph Company is being tried before Justice Davidson at Montreal. It is understood that the counsel for the plaintiff have given another notice that in consequence of the nature of the evidence elicited in the case so far they will make an application to the court for permission to put in an additional demand, asking that the reduction in the amount of rental payable to the Montreal Telegraph Company be increased by an additional two per cent., making the amount to be paid four instead of eight per cent.

The Proposed Australian Cable.

The report of the committee of the Chamber of Commerce of San Francisco upon a cable from San Francisco to Australia, states that the total distance to be covered, according to the calculations on the shorter of the two routes considered, is 6,371 miles, divided as follows: San Francisco to Honolulu, 2,100 miles; Honolulu to Tutuila, 2,271 miles; Tutuila to North Cape, New Zealand, 1,700 miles; allowance for slack, and irregularities of ocean bottom, 300 miles. The deep-sea sections of the cable would probably be eleven-sixteenths of an inch in diameter, the intermediate sections one and one-eighth inches, and the shore ends two and a quarter inches. Roughly estimated there would be 5,000 miles of deep-sea cable, costing $1,000 per mile or $5,000,000; 800 miles of intermediate cable at $2,000 per mile or $1,600,000; 570 miles of shore ends at $3,500 per mile or $1,995,000, making the total cost for the 6,370 miles of cable $8,595,000, to which should be added $1,405,000 for depositing the cable on the ocean bed, landings, franchises, concessions and contingent expenses, giving a grand total of $10,000,000.

Inspecting Boilers While Under Steam.

It is reported that a German scientist has devised an incandescent lamp arrangement by which the interior of a boiler may be inspected while the same is under steam. A thick tube is inserted into a stuffing box, through which a small incandescent lamp is introduced, which is connected with a battery. By means of a thick glass plate, placed in the shell of the boiler at a convenient place, the illuminated interior of the boiler may be inspected. This is likely to be the means of providing remedies for many of the existing uncertainties in boiler manipulation.

THE TELEPHONE MEN.

ELEVENTH ANNUAL MEETING AT MINNEAPOLIS.

A Good Attendance and a Programme of Interest.

SECRET MEETINGS DECIDED UPON, AND PAPERS READ AND DISCUSSED WITH CLOSED DOORS.

The annual meeting of the National Telephone Exchange Association was held at the West Hotel, Minneapolis, beginning Sept. 10th. One of the parlors on the first floor was used as the place of meeting. The old telephone workers were out in force, among them when the Convention assembled being: Gifford, of Louisville; Smith and McDaniel, of Kansas City; Dickey, Korty and Drake, of Omaha; Beach and Wilson, of Chicago. Besides the eastern delegates named last week there were: Capt. Stone, of Cincinnati; Storke and Uline, of the State of New York; Forbes, of Detroit; Hall, Culbertson and Palmer, of Buffalo; and many others. The American Bell was represented by Messrs. Morgan, Doolittle, Brown, Knight, Albree, and others.

FIRST DAY'S PROCEEDINGS.

MORNING SESSION.

The Association was called to order at 11.45 A. M. The president, Henry Metzger, of Pittsburgh, in the chair, and C. H. Barney, of New York, secretary.

The secretary called the roll and announced that it showed there were 28 active, three associate and seven honorary members represented by one or more delegates each.

The President: The next order of business is the application of new members.

The Secretary: Mr. President, I have received an application for associate membership from Messrs. Fellton and Guilleaume, manufacturers of telegraph and telephone cables and wires of Cologne, Germany. They are recommended by the Bell Telephone Company of Canada.

The President: The application of Messrs. Fellton and Guilleaume will be referred to the executive committee for investigation, and report under the rules of the Association if there are objections. Are there any other applications?

The Secretary: No, sir; there are no other applications.

The President: The next business before the Association will be the reading of the secretary's report.

The secretary here read his report as follows:

SECRETARY'S REPORT.

NEW YORK CITY, Sept. 1st, 1889.

To the National Telephone Exchange Association:

GENTLEMEN:—I have the honor respectfully to submit my report as secretary of this Association for the year terminating August 31st, 1889.

The changes in membership since my last report have been as follows:

At the beginning of the Association year the roll of the Association showed 36 active, 5 associate and 29 honorary members. At the meeting in New York in September,

(*Continued on page 6.*)

Remarks on the Telephone Exhibit at Paris and Central Office Switchboard Experiments in Brooklyn.

BY W. D. SARGENT.

It was my good fortune to be selected by the American Bell Telephone Company to take charge of their exhibit at the Exposition Universelle, Paris.

My duties in that connection required me to remain in Paris about two months, during which I spent most of the time at the Exposition, afterwards making a flying trip through Switzerland, Germany, Belgium and England.

The exhibit on the part of the American Bell Company consisted:

First.—Of an historical exhibit, comprising originals and models of the first instruments conceived by Prof. Bell, down to the present forms.

Second.—The most improved form of long distance desk transmitters and metallic circuit switchboards, together with samples of cables, call bells and other apparatus; also a large pole, complete with cross arms, braces, etc., typical of the best form of line construction in this country of the present day. Wires were run from our space in the industrial section of the United States to connect the various offices and departments of the United States Commission. All these wires were run overhead on the buildings and centered in a switchboard where an operator was stationed to make the necessary connections. This system proved of great service to the commissioners and was the only active part of our exhibit.

Outside of the telephone exhibit the only electrical exhibits in the United States section were those of the Western Electric Company, embracing general electrical goods, Prof. Elihu Thomson, the Elektron Manufacturing Company, the "C. & C." Motor Company, the Okonite Manufacturing Company, the Consolidated Electrical Subway Company, of New York, and the Cobb Wire Company.

Prof. Abdank-Abacanowicz was in charge of the United States exhibit, and was particularly efficient in arranging the space and looking after the interests of exhibitors. The rest of the electrical exhibit was in machinery hall, being principally in the line of light and power, although there were many forms of burglar alarms, electric bell installations, speaking tube telephones, etc.

Mr. Edison, who occupied the largest space of any single exhibitor, showed all his various inventions with which we are familiar in this country.

The telephone business in Paris, so far as the central office is concerned, is conducted practically the same as in this country, but all their wires, as is well known, are underground in the extensive sewer system for which the city is noted. This sewer system affords an easy solution of the underground problem, but as it has been described to this Association before, it needs no further description at my hands.

In all the cities where I stopped long enough to make any observations, I found the telephone wires universally overhead, the house-top construction being very much superior to anything we have in this country. The roof fixtures are made of light iron carrying a very small phosphor bronze wire, so that large masses of wire are scarcely visible, and the fixtures themselves are so light and airy that to the eyes of a telephone man they are ornamental rather than otherwise.

I did not notice the use of overhead cables to any great extent, except in London, where the telephone system is entirely overhead and the construction is of much the same character as in the other European cities, except that they use overhead cables. In Trafalgar Square a large lead cable is stretched across one side of the square, in full view from all points, and wherever you may look up in the heart of London you will see wires and cables extending in all directions.

The British postal telegraph department put all their wires underground, and as they do a limited amount of telephone business their telephone wires are underground. Their method has been described before and consists in drawing gutta percha wires into three and four-inch iron pipes laid directly under the pavement, just inside the curb, or between the curb and house line, with manholes or handholes at convenient intervals.

I could not learn from any of the electrical people that I met abroad that any plans had been made for a general system for placing a telephone exchange system underground.

Several other members of the Association have been abroad this year and will doubtless be prepared to give you the benefit of their observations. My own impression is that we have little or nothing to learn abroad, and that it will not be very long before the requirements of the business in London and other large cities will necessitate their placing their wires underground, and that we will be able to teach them many things when that time comes.

For several years I have been reporting to this Association the progress of the underground work in Brooklyn; these papers will be continued this year by Mr. J. C. Reilley, the general superintendent of the N. Y. & N. J. Telephone Co., to whom the credit of the very successful work in Brooklyn is in a very large measure due.

A little over a year ago our largest central office in Brooklyn was equipped with the single wire multiple board, and I have brought here the results of 13 months experience with the board, together with tabulated statements and remarks and conclusions by Mr. George J. Davison, manager of our Brooklyn office, who has made the subject a study, and which I will now proceed to read.

W. D. SARGENT, Esq., *Gen. Mgr.:*

Dear Sir—In making a report to you of the workings of our new switch, it might, perhaps, be well to go back some years and recall the circumstances which led to its adoption.

The exchange was opened in 1879 at No. 4 Court street, removed in 1880 to 397 Fulton street, with 52 subscribers connected, being then operated by the Chinnock system, which was changed in 1882 to the so-called Western Electric standard, section after section of which was added as needed by the increase in subscribers, until at the time of the purchase by this company of the property at 16 Smith street, there were in use sixteen 100-wire sections of mixed subscribers and trunk lines and five sections of purely trunk lines.

The switch, battered and worn after six years service, was not adapted for the proper care of so large a number of subscribers as had eventually been connected, nor in keeping with the company's new building which was to be fitted up with the best appliances in all respects. The single cord Western Electric multiple board was selected in the belief that it was the best then devised, the most rapid and the one with which the operators could handle the maximum number of calls.

The switch was ordered in nine sections, of which five were for subscribers lines, only one subscriber on each line. The trunk lines were in sections by themselves, while the pay station lines and the circuit lines (that is those on which were two or more subscribers), with any others which required special calls or care in any way outside of the regular order, were also put by themselves. This arrangement of the switch was in accordance with your belief that this was the proper disposition to make of the various circuits so that the direct or single wire subscriber operators should be entirely free from having to make any connections, other than those which were local and thus be enabled to give more rapid and better service, and also to determine the maximum rapidity of this form of switchboard. The experience gained in the use of this switch has demonstrated the advantages of classifying the business.

One of the direct subscribers sections was equipped with double cords, but with the same looping in and ringing device as on the single cord sections. This modification of the general plan was made because the section so modified was in an angle of the operating room, and it was impracticable to put the full complement of single cord equipment in the reduced keyboard space, and it was also felt that it would be desirable to have one section of double cords, not only as a relief or emergency section, but also for the purpose of comparison as to the respective merits of the two systems.

During April, May and June, 1888, the switch was put into position, all subscribers and trunk lines were connected into it, and everything being in readiness at midnight, Saturday, June 30th, 1888, we cut away from our old switchboard and removed into the new quarters.

There were 1,476 wires connected with our switch at the time of removal, besides about 100 private lines (switch lines, etc.), which come into the distribution room for test or other purposes, making nearly 1,600 wires to be transferred. On Sunday we handled almost the usual volume of Sunday business without serious friction. At morning test on Monday there were but 76 wires which were not in working order, and these were so nearly cleared up during the day that by Tuesday morning our test showed very little over the general average of wires not working.

In accordance with your instructions, a record was made up of all troubles arising in the working of the switch at the time of their occurrence, and from these records I have compiled, and hand you herewith, a tabulated statement showing the number of difficulties arising each month and the particular part of the equipment in which such troubles were developed, and will endeavor to point out the cause and possible remedy for some of them.

As shown by this table, during the 13 months' use from July 1st, 1888, to August 1st, 1889, the switch and its equipment have required attention on 1,115 occasions. Of this number 275 were confined to the cords, the balance of 840 being entirely in connection with what may be termed the fixed mechanical parts of the switch.

These 840 difficulties occurred in the various parts of the equipment as follows:

Spring jacks	11
Drops	294
Combination keys	459
Grounding jacks	76

The trouble in each of these parts has been classified in the accompanying table, so as to show as nearly as possible just where each occurred and consequently where the principal weakness lies.

Spring jacks.—The spring jacks are what is know as the "Boston type," and there are 15,660 in use, all of which are set horizontally in the switch. The troubles with this part of the switch have been only 11, ten of which were failures to close the line on withdrawal of the plug, and one a loosened wire where soldered into the jack. The first were readily located and easily remedied, the difficulties being particles of dust or other matter at point of contact, which the insertion of a "jack cleaner" removed. The loosened wire was resoldered with little difficulty. The use of platinum contacts instead of the present ones of german silver and brass is the only suggestion of improvement which I can make for the spring jacks. It should not be forgotten that this is the first 13 months' use of the switch and that the trouble at this point must be a growing one, and, therefore, all should be done that is possible to do to guard against it.

Drops.—The drops used, both for subscribers and trunk lines, are of the Warner pattern, and 1,660 are in use, 294 having required attention. Over 80 per cent. of all trouble with this part of the apparatus was developed in the first two months the switch was in use. The troubles are classified as follows:

With the catch	26
Shutter	36
Armature trunnion	203
Crossed with core	6
Open in coil	2
Burned out	1
Broken wires	20

The "catch troubles" were trivial in their nature and easily remedied, requiring no more than a slight bending of the catch in the proper direction. The shutter troubles were caused by the shutter being too flat, so that it rested close against the face of the drop and hence failed to fall when released by the catch. This failure was due to two causes, that is, air pressure and the center of gravity falling directly over or inside of the hinge. The remedy was bending the shutter outward from the face. A slight modification of the form of the shutter in this respect would be advisable.

The "armature trunnion" troubles were caused by a slight rusting of the iron bearings, caused by dampness, and were principally developed in August, 1888, when 190 required attention. The substitution of some metal other than iron at the point of bearing would very greatly reduce this difficulty.

The "crossed with core" caused by abrasion of the insulation. The "open in coil" and "burned out" do not require any special mention, nor do the "broken wires," which were generally the result of lowering the drop shelves for other repairs.

Combination keys.—Of the combination keys 1,560 are in use and 459 have required attention. Troubles are classified as follows:

Operators' spring on line	25
Angle piece loose	10
Cutting out and failing to close in line circuit	197
Operators' circuit not closing	44
Rubber plunger broken	8
Operator "cannot cut out"	118
Broken wires	57

"Operators' spring on line" is caused by a loosening of the nut which holds the parts in position, and which could be avoided by slight changes in construction. This is an especially annoying trouble when it occurs at a busy hour, inasmuch as it short-circuits the operator's instrument and all connections for at least 100 subscribers must be made by adjacent operators by the use of "helpers" and at a serious disadvantage.

"Angle piece loose" refers to the angle piece on the under part of the key and which is a part of the main line circuit. Trouble arises from the loosening of the screw holding it in position.

"Cutting out or failing to close main line contact" has reference to trouble at point of contact between the angle piece just mentioned and the main part of the key. This is the most serious of any of the troubles which have arisen in any part of the switch. None of it appeared for the first nine months, while in the last four months 197 keys had to be attended to—an average of 50 per month. The trouble so far has been almost entirely confined to the trunk line and double cord section keys, these being used more frequently than a subscriber's key, but there can be no doubt that it is only a matter of time when it will spread throughout the entire keyboard. The contact where trouble occurs is only a pressure contact and between german silver and brass. The brass is in the form of a small rounded knob which becomes covered with a black deposit, either from corrosion, dust, or other cause. This does not entirely open the line (the generator current never failing to pass through it), but it forms almost a complete barrier to the passage of the telephonic current. An especially bad feature of this trouble is that it is not necessarily apparent to the operator, who, when she cuts in hears the subscriber through another connection, and while she remains in on the connection (in all probability with her hand on the key adding additional pressure and firmly making the contact), the subscribers may talk without any trouble. She no sooner cuts out, however, than the trouble begins. The voices die away, the subscriber rings, the generator current passes the obstructed point and for a moment or so conversation goes on, only to be again interrupted as the operator jars the keyboard by manipulation of adjacent keys. The trouble can be reached only by raising the strip of keys out of the keyboard, taking the one in trouble entirely apart and polishing the points, or, more correctly, the parts where the trouble is. Of the difficulty in doing this I shall speak more hereafter. The trouble would, I think, be greatly lessened by the use of platinum contacts, but the conformation at this point is especially bad and I do not believe that any substitution of metals, while retaining the present shape, would entirely remedy the evil. The contact is not a sufficiently positive one; it is at best dependent entirely on the tension of the spring of the key proper, and is liable to be interfered with at all times by the operator's hands and arms as they work.

"Operator's circuit not closing." This trouble arises from dust accumulation and is easily remedied, except so far as the raising of the key strips is concerned.

"Operators cannot cut out." In these cases the iron rod of the plunger becomes completely or partially stuck, so that the operator cannot manipulate it. Remedy, a touch of oil, or filing. The broken wires in the case of the combination key, as in all the others, is due almost entirely to breakage while making repairs.

Grounding jacks.—There are 1,440 of these in use, 76 of which required attention. The troubles arising were:

Test crossed with line	8
Operator's connection crossed	5
Line spring weak	17
Operator's connection not closing, dirt accumulation	3
Broken wires	43

The first three classes were all due to one cause, namely, the loosening of the screw at the base of the line spring, which allowed one or other of the parts to get out of position, thus causing the trouble. These screws are short and screw into hard rubber, and an effort to set them firmly is likely to result in the stripping of the thread and leaving matters worse than before. The line and test springs too do not fit into the rubber as closely as they should, which would otherwise prevent their getting out of position, even though the screw was loosened.

"Operator's connection not closing on account of dust" was easily cleared.

"Broken wire" due to cause heretofore noted.

Cords.—There are 1,480 cords in use, of which 280 are on trunk and double cord sections. Of the subscribers' cords but eight have failed, while of the trunk and double cord sections 170 had to be repaired. The explanation of this great difference in favor of the subscribers' cords is that a subscriber's cord is used only to complete those connections for which he may call, while on a trunk or double cord section each cord may be used any number of times.

One of the "operators helpers cords" is furnished each operator for the purpose of answering a subscriber instead of doing so in the regular way; like the trunk and double section cords, they show the effect of frequent use.

The failure in all of these was just at the base of the plug and was due almost entirely to wear and tear, it being hastened, however, in a good many cases, particularly in the "helper" cords, by the rusting of the iron wire, caused presumably by the moisture of the operator's hands penetrating the cotton covering.

The failure in the telephone cords was always at the point of connection with the tip.

The failure of the transmitter cords was due, I think, almost entirely to their passage through the pulleys of their supports.

The transmitters in use are the "skeleton" with counterpoise weights in the rear of the switch. While these transmitters are more liable to get out of order than when enclosed, they are also more easily adjusted, and, being smaller, the view of the switch is less obstructed, and they can be put out of the way when not in use and on the whole are preferable.

The sections of our switch are 6' 3" in width, with an actual keyboard space of 70x9 inches. Within this space, on subscribers' sections, are placed 300 combination keys and 300 grounding jacks, through each of which a weighted cord is passed. On each combination key and grounding jack are soldered three wires, making in all 1,800 wires under the keyboard of each section. To make repairs to the grounding jacks is not an easy task, but when it becomes necessary to take a combination key apart to clean it, it is a serious matter.

To do this, the strip of 20 keys, of which

the troubled one is a part, must be lifted completely out of the keyboard, which is particularly difficult on account of the necessarily short forming of the wire cables. After repairing and replacing the keys it will not infrequently be found that one or more of the wires have been broken, and which it may require half an hour's struggle to replace. In the resoldering of such broken wires it is almost an impossibility to so dispose of the wires and cords as to permit the insertion of the hot iron without at least scorching some of the cotton insulation. That such breakages, scorchings, etc., will eventually produce a bad state of affairs is readily apparent.

Among the advantages of the single cord system are the fewer motions necessary and the consequent speed with which a call may be secured and completed; the 50 per cent. reduction in the number of cords necessary to complete a given number of connections and the calling subscribers' drop being left in circuit makes the "ringing off" as prominent as a "call" and the operator's attention is not divided between two sets of drops.

I think each operator on the single cord system should be furnished with a few pairs of double cords. With these she could complete connections for operators on either side of her in case of a sudden rush or failure of instruments. She could make connections to make a connection, but may substitute another at any moment.

The last objection I shall name, but which, perhaps, is one of the most serious, is that the single cord system is not conformable to a purely metallic, nor to a mixed metallic and grounded circuit system, because of the impracticability of closing both sides of the metallic circuit when the plug is at rest on the keyboard.

With our old switchboard, Western Electric standard, an operator was assigned to each 100 subscribers; with the new system each operator takes care of 150 subscribers and does the work more easily than before. This is an important saving of 33⅓ per cent. in operators. In consequence of the changes which were made in operating the trunk lines, the reduction was not so great as this.

In order to test the quality of the service rendered with the present system and to compare it with the service rendered at the sub-stations of this exchange, a special inspector was sent out with instruments to make test calls from all parts of the city, at all hours of the day and night, and for all points within the division. The results obtained in something over 1,500 calls are shown in an accompanying table. The calls were made by the subscribers themselves, in order to guard against recognition of the inspector's voice by the operator, and the result obtained is as fair a test of the service as it is possible to get. In explanation of the large percentage of "don't answer" in the "failed" connections, I would say that the inspector frequently when calling at night asked for numbers that were sure to be closed, in order to avoid annoyance to subscribers, the object of the calls being to test the promptness with which operators responded at such times.

This compilation does not show results very greatly in favor of the multiple system, except in the great number of subscribers assigned to each operator.

Our operators are instructed when answering a call, to use the words "what number," and to repeat the number so that the subscriber may know that the call has been correctly received, and when ringing direct wire subscribers, to give three distinct rings. The latter rule was made to guard as much as possible against subscribers being needlessly called to their telephones by ringing off, crosses, or other irregular ringing of their bells.

*** The California Electrical Society held its first fall meeting recently, Orin Brooks presiding, at B'nai B'rith Hall. The attendance was quite large, and the proceedings were of an interesting nature. Frank P. Medina, of the Pacific Postal Telegraph Company, gave an interesting lecture upon telegraphic topics relative to existing systems.

Switchboards and Long-Distance Lines on Grounded Circuits.

BY FLEMON DRAKE.

The secretary of this association has asked me to submit some observations covering the experience of our company with switchboards and also with long distance telephone lines on grounded circuits. Such a thing as writing a formal paper to be read before the association, that will interest its members, is beyond my capacity. I should dread disappointing the expectations of those who suggested it, but such information upon the subjects of switchboards and long distance grounded circuits as my experience affords will be gladly placed at your command.

I think it is settled beyond all controversy that a cord and plug board, of convenient size and construction, is the best, by all odds. The more simple such are in construction and mechanism, the better. We have in use in our smaller exchanges a very compact, simple affair; a strip of wood upon which are arranged 10 metal plugs or points a little less than one-fourth of an inch in diameter and about an inch and one-fourth long. These have a shoulder resting on the front side of the strip with screw and washer holding them at the back. Just above this, passing through the wood, is also placed a spring similar to those in the Western Electric spring jacks.

This is fastened to the back of the strip, bends down in contact with the plug or pins at about three-quarters of an inch from the face of the strip. A hollow plug, with rubber shield attached to cord, makes the connection in the usual manner. These strips are fastened on to the switchboard frame, the same as any other strip for spring jacks would be, in rows of ten, thereby constructing a 50 or 100 wire switchboard, as desired. A false face of wood, fibre, or rubber, with holes at proper places to give access to the hollow plug in connecting with the spring jack, is placed over the hole and the subscriber's number stamped in the proper place. Any suitable annunciator can be used. This arrangement gives us a board very compact, and convenient for access to all its parts. This company has only one multiple switchboard in use, that at Omaha. This is the Western Electric board, constructed in all respects the same as others except in the matter of clearing out drops. Owing to the system prevailing here of each subscriber himself ringing the party he desires to talk with, it was desirable to have a drop which could be made to signal the central office or not, at the will of the subscriber. In the place of the ordinary clearing out drop we therefore substituted a galvanometer drop. A permanent magnet suspended inside of a coil which vibrates only slightly under the influence of the generator current. On the generator is a special commutator which is put into circuit by the subscriber pressing a button at the same time he turns the crank of his bell. This operation throws the current upon the line, affecting the galvanometer drop to such a degree as to tip the catch of the shutter, at the same time giving nothing more than one click on the bell of the subscriber with whom he may be connected. This arrangement and system has worked very satisfactorily indeed. It gives the operator less work, enabling her to handle subscribers more rapidly than if she is delayed by ringing up those who are called for. I know that it is claimed by many that it is the duty of the telephone company to do all that is necessary to get the two subscribers to talking, but our experience seems to indicate to us clearly that subscribers are better satisfied if they get the connection promptly and are given the opportunity of doing the calling. It occupies their mind; the time of waiting is thereby shortened (to them), and when the party does not answer they seem better satisfied. These observations are confirmed by the reports of those who have used other systems in other cities. So fas as I know, these reports are invariably favorable to our system. It is also claimed that the ringing done by the subscriber wears out the machinery more rapidly. Ours has been in use a little over two years, and we have had no more than the ordinary troubles so far. I do not see why it is not as easy to construct a bell that will last indefinitely, as far as the wear is concerned, as it is to construct a dynamo that will run for years.

Regarding the subject mentioned in the secretary's letter — long distance lines on grounded circuits—I will say that while our success has, perhaps, in some respects been above the average, I am decidedly of the opinion, nevertheless, that we will find it desirable to adopt metallic circuits for all routes extending 100 miles or more. From Omaha we have circuits reaching to the following points: Columbus, 90 miles; York, 129 miles; Sutton, 145, and Fairbury, 135 miles. The circuit to Sutton is wholly hard drawn copper wire, weighing 213 pounds to the mile. The others are mixed circuits, iron and copper. We daily do business between subscribers over these circuits. Of course, in summer we experience more or less difficulty from atmospheric disturbances, and in the evening there is sometimes disturbance on account of electric light plants in the different towns through which we pass. Upon an average, one-half of the communications between these points are made direct between the subscribers without the assistance of the operators.

Notwithstanding this showing, I am satisfied that it would be better for ourselves and our customers that we make each of these a metal circuit, and work it as such. Our business could easily be increased 50 per cent. thereby. In considering the economic phase of long grounded circuits I am fully satisfied that no telephone company is justified in making a low rate for long distances; that there is much more profit in working a short circuit at a low rate and charging a good stiff rate whenever the circuit of 60 miles and over is used.

If it should appear from this statement that we have a greater degree of success in working our circuits than is obtained in the East, I would attribute it, I think, to our comparative freedom from the disturbing influences of other lines—of the telegraph, motor, power and electric light. Without a doubt, the proximity of earth circuits have a marked effect. As an illustration, I may mention that we talk as well ordinarily from Columbus to York by way of Omaha, as we can either to York or Omaha alone. That you may comprehend the peculiarity that I mention I will state that both towns are nearly west of Omaha, Columbus 90 miles and York 129 miles by wire, and the latter about 50 miles south of Columbus. The wire to York makes a detour to the south through Lincoln which adds to its length. Practically York and Columbus are the two ends of an ox bow, and Omaha in the middle of the bow, when the lines are connected together.

We are extending our system, and probably by the time of the assembling of another convention we shall be attempting to work a copper grounded circuit, Omaha to Kearney, 210 miles.

*** At Scranton, Pa., a singular accident occurred recently: A telephone wire broke and in dropping to the ground fell across an uninsulated guy wire of the People's Street Railway Company. By this means, the full strength of the current of the guy wire was transmitted to the telephone wire. Dr. Hand drove along a few minutes later. His horse, the most valuable one in his stable, planted its foot firmly upon the innocent looking wire and dropped dead. Startled by the fall of his horse, and unable to understand the cause, Dr. Hand sprang from the carriage and ran to the head of the dead animal. He grasped it by the bridle in an effort to lift it to its feet and himself received a severe shock which prostrated him and temporarily paralyzed his right arm. After a time the numbness disappeared.

RECORD OF SWITCH TROUBLE AT BROOKLYN, N. Y., SINGLE CORD W. E. MULTIPLE. JULY 1ST, 1888, TO AUGUST 1ST, 1889.

Month.	Spring Jacks, 15,660 in Use.			Drops, 1,660 in Use.								Combination Keys, 1,560 in Use.								Grounding Jacks, 1,440 in Use.					Total Troubles in Switch and Keyboard Proper.	Cords.					Grand Total of Troubles of all Kinds.
	Dirty Contact.	Unsoldered Wires.	Total.	Catch.	Shutter.	Armature Trunnion.	Crossed With Coil.	Open in Coil.	Burned Out.	Broken Wires.	Total.	Operator's Spring on Line.	Angle Piece Loose.	Cutting Out at Main Line Contact.	Operator's Circuit Closer not Closing.	Broken Plunger.	Operator Cannot Cut Out.	Broken Wires.	Total.	Test Crossed With Line.	Operator's Connection Crossed.	Line Spring Weak.	Operator's Circuit Contact not Closing.	Broken Wires.	Total.	Subscribers, 1,200 in use.	Trunk & Double Cord Section, 300 in use.	Operators' Helpers 21.	Telephone 21.	Transmitter 42.	Total.	
July, 1888	..	..	..	9	15	2	..	..	..	6	32	7	..	..	1	..	..	..	8	16	3	..	3	..	6	54	..	..	..	..	..	54
August, "	1	..	1	7	5	190	..	..	..	12	204	3	3	..	3	..	..	..	3	12	2	2	1	..	1	223	..	..	1	2	2	5	228
September, "	1	..	1	2	3	..	1	..	..	4	10	1	..	..	..	..	..	..	1	2	..	1	..	..	1	16	..	6	4	..	10	26
October, "	..	..	..	1	2	..	2	..	..	..	5	2	1	..	..	..	..	..	3	7	1	1	..	..	2	25	2	10	1	2	15	40
November, "	..	..	..	..	..	1	2	..	..	3	6	2	3	..	3	1	..	..	4	13	..	..	..	..	6	25	2	10	1	4	17	44
December, "	1	..	1	1	..	1	..	1	..	1	4	1	..	..	4	1	1	..	6	13	..	..	5	..	5	31	..	10	3	8	1	22	53
January, 1889	1	1	2	2	..	2	1	1	..	2	8	1	..	..	11	..	8	..	7	27	..	..	8	..	8	47	..	15	5	2	..	22	69
February, "	1	1	2	2	3	..	..	..	..	..	5	..	..	..	11	2	11	..	3	27	..	..	..	..	2	35	..	21	3	5	1	30	65
March. "	1	..	1	1	4	..	..	..	..	..	5	1	2	..	5	1	3	1	13	1	..	..	..	..	1	22	1	18	1	4	..	24	45
April, "	2	..	2	..	..	..	..	..	..	..	..	..	..	25	3	1	14	2	45	..	..	..	3	..	5	55	..	9	5	2	..	16	71
May, "	..	..	..	1	1	..	..	..	1	3	4	..	..	50	1	1	51	5	121	..	1	..	..	9	10	134	..	20	9	3	..	32	166
June, "	..	..	..	..	2	..	..	1	1	4	8	1	..	34	..	1	30	9	76	1	..	..	..	..	3	84	..	15	..	2	..	17	101
July, "	2	..	2	..	1	7	..	..	..	..	8	3	..	79	..	..	..	..	5	87	..	..	..	..	1	98	4	32	10	7	2	55	153
Total	10	1	11	26	36	203	6	2	1	20	294	25	10	197	44	8	118	57	459	8	5	17	3	43	76	840	8	170	40	48	9	275	1115

RECORD OF TEST CALLS MADE FROM SUBSCRIBERS TELEPHONES CONNECTED WITH BROOKLYN, N. Y., EXCHANGE, AND SOME OF ITS SUB-STATIONS. CALLS MADE AT ALL HOURS OF THE DAY AND NIGHT.

	Style of Switch.	Total No. of Subscribers.	No. of Subscribers assigned to each operator	No. of Test Calls Made.	Answers from Central. No. of Seconds.			Conversation begun. No. of Seconds.			Disconnection. No. of Seconds.			Forms of replies by operators.				No. repeated or not.		Failed Connections.		
					Quickest.	Slowest.	Average.	Quickest.	Slowest.	Average.	Quickest.	Slowest.	Average.	What Number.	Well!	Hello!	Miscellaneous.	No. Repeated.	No. Not Repeated.	Busy.	Don't Answer.	Miscellaneous.
	Single Cord																					
Brooklyn	W. E. Multiple	1582	150	348	5	44	8.307	13	70	31.095	12	70	17.184	341	1	6	....	343	5	3	62	1
Williamsburgh	W. E. Standard	1084	100	279	4	70	8.093	13	240	32.800	11	180	21.338	277	....	2	..	278	6	2	39	1
Bedford	" "	434	100	314	4	180	9.086	18	120	36.800	9	30	19.140	304	...	10	....	305	9	3	59	
Greenpoint	" "	264	75	358	5	60	8.469	12	70	32.725	11	600	22.640	353	1	4	....	347	11	3	71	
South	" "	143	75	235	4	20	7.905	18	60	38.687	11	33	20.077	230	1	4	....	230	5	..	40	
Total		3457	....	1534	4	180	8.411	12	240	34.123	9	600	20.057	1505	3	26	....	1498	36	11	271	2

for those of her own subscribers whose cords were found to be out of order, and in addition, use these extras at night, instead of going to the switch where a call is received.

Among the disadvantages of the single cord system are, the multiplicity of soldered wire connections; the defects pointed out in the keyboard, especially in the combination key; the delays and annoyances to operators and subscribers in making repairs to keyboard; the necessity of the calling subscriber remaining with the receiver to his ear until the desired connection is had or the operator's report received; there being no facilities provided for ringing back to the calling subscriber and because all calls must be answered and the connections completed at the section of the switch where they originate. This objection becomes a serious one when there is trouble on any operator's instrument connections in the keyboard.

The smallest number of subscribers that it is possible for us to put on any operator's instrument is 100. Trouble arising with an instrument, the operators on either side must attend to this operator's work, which can only be done by answering with their "helpers," and after testing in the same way completing the connection with the calling subscribers' cord, a slow, inconvenient and embarrassing method.

The advantages of a double over a single cord system are apparent at such times, and are equally so on Sundays, holidays, evenings and slack times generally, because an operator with the double cord may answer any call and complete the connection from any point at which she may happen to be, and also for the reason that the operator is not dependent on any one cord with which

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We invite correspondence from Electricians, Inventors, and the Telegraph and Telephone fraternity and those engaged in Electric Lighting, on matters pertaining to electrical and scientific subjects, and all facts of special interest in connection therewith.

We extend to manufacturers of electrical apparatus an invitation to send to this office any and all facts concerning their business which will be of interest to the public. We make no charge for publishing news.

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NEW YORK, SEPT. 21, 1889.

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The service done and to be done suburban residents of the cities of this country by the introduction of electric railways, is hardly to be estimated. Not only do they furnish transportation themselves, but by competition force upon the steam lines the necessity for quicker and better service.

When we realize that only one person out of every two thousand in this country reads the electrical journals, it may be seen that the electrical fraternity owe it as a duty to the general public to inform them of the safe methods of handling this mighty force which we call electricity, but of which we know naught save by its results.

It is now stated that the recent rumors regarding the financial embarrassment of Johns Hopkins University are unfounded. This will be welcome news to all American electricians, for institutions of this kind are too much needed in this country to permit of their being hampered for pecuniary aid.

Papers were filed last week in the United States Circuit Court in the suit of the Boston Safe Deposit and Trust Company against the Bankers and Merchants' and the United Lines Telegraph Companies, John G. Farnsworth, Edward S. Stokes and others, and the American Rapid Telegraph Company. In April Judge Wallace granted an injunction in the suit, and the defendants were ordered not to use certain lines belonging to the American Rapid Company, on which the trust company held a mortgage, and it was further ordered that the property be turned over to Receiver Harland of the American Rapid Company. An extension of time was obtained by the defendants until September 1, and it was supposed that the injunction order was to be obeyed. As it was not the injunction was put in force.

What is the use of being obliged to go to the superintendent of streets for a permit to dig up the pavements to lay wires if that official has no authority to deny the privilege if he wants to? It is evident that the laws defining the rights of the city to order wires underground, the public to protest against digging up streets, and the persons who wish or are compelled to lay the wires, might be much improved in many of our large cities.

Not only was the stiff formality which often pervades such documents wanting in the admirably worded resolutions presented by Mr. Morris F. Tyler on the death of George L. Phillips and unanimously adopted by the National Telephone Exchange Association last week, but the remarks of those who seconded the motion told in their tenderly clothed passages of the acute loss which every man felt he had personally encountered. Deepest sincerity pervaded the entire proceedings.

Dr. Chauncy M. Depew is of the opinion that America will have to get up early in the morning when she tries to outdo Paris in the matter of an international exposition; very likely, but we have yet to find the American who does not confidently believe that the Fair of 1892 will out-Paris Paris. Why! even some of our western cities, scarce a generation old, feel no hesitancy in attempting such an undertaking—if they get an opportunity.

There is seldom presented a better example of the manner in which a speaker's meaning can be reversed than in the remarks of Mr. Lockwood at the banquet of the Telephone Convention at St. Paul, during the course of which he says, in speaking of Bell's fundamental patent: "A great many people have said, and I myself think that it is true, that he (Bell) never heard a telephone talk until after this patent was issued." This savors of Pan-electricism, but when read in connection with the context which reads: "I do not think anybody now really doubts that Alexander Graham Bell really invented the telephone," the suspicion of treason is removed and the true meaning of the speaker is conveyed.

It would really be quite refreshing if some reliable information could be obtained about the Peral electric torpedo boat, regarding which special cablegrams last week to a leading New York daily announced first that she was a complete failure and almost immediately afterwards that she was a wonderful success. We now hear, to use the Yankee expression, that she is not all that she is cracked up to be. These reports, to say the least, are not exactly in absolute agreement, and there is probably no immediate danger of Sir Peral coming over here and sinking the Great American Navy for the purpose of demonstrating the superiority of his own craft. After all it is not well to get much alarmed over electrical inventions about which we know but little save the difficulties they are supposed to overcome. The problem of constructing submarine boats operated by electricity is as old as the story of Captain Nemo, and has received the attention of some of the world's best engineers. The question will not be solved by some quickly devised electrical apparatus or an ingeniously designed boat, but will require a signal advance in the methods of either generating or storing chemical, thermal or electric force. If in reality the brilliant young naval officer of Cadiz has solved the problem of submarine navigation, he has at the same time solved other physical problems which will be of by far more value to the world.

Denver and Leadville will soon be connected by telephone. The Colorado Telephone Company has about completed its line between the two cities. It will be as nearly air-line as the configuration of the country will admit; will be so well and strongly constructed as to insure it against interruptions by storms, and will be one of the most expensive lines ever built. The wires will be pure copper. The rate will be $1 for a five minutes talk.

The connection of the two largest cities of the State by telephone wires will be a great convenience to both. The new line cannot fail to do a large business, and will doubtless be profitable to the owners.

The building of so long a line, over mountains and through canons, shows the disposition of the company to give the people of the State an extensive and effective telephone service. It is also indicative of an energy, enterprise and courage that reflect great credit upon those who originated the scheme and have carried it so quickly to completion. The success of the line will insure the extension of the telephone system to every important town of the State.

A SAVING OVER GAS.

One year ago Little Rock, Ark., replaced gas with electricity for street lighting, putting up 100 lamps at first, to which they have added ten during the year. The city was at that time paying about $12,000 per year for gas. The new system has furnished about eight to ten times as much light at considerable less cost, as shown by the city clerk's report recently made public. In his official report Mr. W. H. Hinkle, superintendent of electric plant, shows the yearly running expense to be $6,766.99, a very substantial reduction.

WHAT THE TELEPHONE CONVENTION SHOULD HAVE DONE.

As we predicted in the last issue but one of the ELECTRICAL REVIEW, the electric railway problem was one of the most important questions considered at the Telephone Convention. We are sorry that no definite plan of action was framed. The thousands of telephone subscribers who are inconvenienced by the disturbances caused by electric light and electric railway circuits, are certainly entitled to that consideration, and the telephone companies who invested large capital in extensive plants constructed in accordance with the state of the art previous to the introduction of electric lights and railways, have rights which should not be ruthlessly brushed aside. On the other hand, the electric railway and the electric light, although practically unknown a few years ago, have now become factors in our daily life which cannot be ignored, and which are as necessary as the telephone. This is the view which has often been taken by the courts and legislative bodies. This being the case, it seems to us that a satisfactory solution of the problem can only be obtained by an amicable arrangement between the companies themselves, without resort to the courts with the attendant expensive litigation. We firmly believe that the various electric systems can be worked in harmony.

The problem can only be solved by the co-operation of electric light and telephone experts, as the difficulties presented are some of the most perplexing in both departments of electricity. For this reason it is to be regretted that the REVIEW's suggestion, looking to the appointment of a committee of telephone experts to confer with the electric light and railway companies, was not adopted at Minneapolis.

ELECTRICAL NEWS.

Boston, Chicago and Other Points.

OUR CHICAGO LETTER.

The Current Stopped.—Good and evil are comparative—so are sorrow and happiness—and darkness is all the darker after a flood of light. The astonishment of Chicago's good people was intense on Wednesday evening, when the machinery at the power house met with a trifling accident, and "the lights lit out" for about an hour. When the pitchy darkness was again dissipated, the electric lights seemed at least twice as powerful as before.

Electric Railway.—Articles of incorporation of the Chicago Central Street Railway Company were issued yesterday by the Secretary of State to Belton Halley, Messrs. Tooten McKillop and J. H. Ludden. The incorporators are mostly real estate men, and it is thought there is a gentleman from Africa in the woodpile, somewhere, as no one of the parties named will give any information. It has, however, transpired that an electric railway is intended.

French Cunning.—Among the exhibits in the electrical department of the French Exposition are two applications of micro-telephones for domestic use in the Eaves dropping line. One of these to all intents and purposes an innocent framed landscape, hangs a little out from the wall, and is a delicate microphone, with wires leading to a receiving instrument in another apartment. This may be called the taller.

A second form is called the master's ear. An imitation thermometer hangs against the wall, merely as an ornament. Behind the bulb, and delicately adjusted, is a microphone. There is also hidden behind the fancy dummy a mercury tube with thermostat connections, so that a second set of wires behind the ornamental thermometer lead to a fire alarm annunciator and bell.

Messrs. A. L. Ide & Son have sold to the city of Chicago 16 engines, boilers, etc., complete for the coming electric light plants. These machines are the high-speed Ideal engines, and will be located at the four plants which are to give light to the citizens and will be an exhibition at the World's Fair in 1892. These plants were sold through the personal effort of Mr. W. B. Pearson, against severe and persistent competition.

Theatre Illumination.—Hoole's Theatre has recently been wired and is lighted by the Edison central station. The Windsor Theatre is also being wired for an isolated Edison plant. The former has a total of 800 lights. The latter will have about the same number. An 80 horse-power Russell engine will furnish the energy (how careful one has to be in the use of that word now-a-days!) and two Edison dynamos will develop the flu—the liq—what Lufkin calls the "juice." The plant is placed beneath the Westminster Hotel.

Personals.—Mr. W. B. Pearson, Chicago, agent for Messrs. A. L. Ide & Son, of Springfield, Ill., is just now looking and feeling remarkably well. The cause is presumed to be located in the fact that in the face of very stubborn opposition he has been successful in capturing for Messrs. Ide & Son the contract to furnish this city with four complete steam plants, including four Ideal engines, of 125 horse power each, with the necessary boilers, pumps, heaters, etc., for the city's four electric light stations to be constructed this season. The contract limit is December 12, 1889.

J. P. B.—In an interview the other day the Professor said: "We now have 6,000 miles of electric wires under the pavements. No other city on the continent begins to come up to that record.

"We have completely demonstrated that the system is a success, but we have hardly silenced all objectors. Some of the companies started out with the definite purpose of defeating the attempt to bring down the wires. When they were forced to put in an underground line inferior material was used. The precautions which were taken to guard against induction on the overhead wires were dropped. The results were as poor, and no poorer than they would have been with the same lines overhead. But they are all through with that scheme now. They are fully convinced that wires have gone underground to stay, and when they run a line now it is put in with proper care, and it works with entire success. The city's service is working as well as could be desired. The maintenance of an underground line costs but two per cent. of what it would cost if it were on poles. The electrical difficulties are the same—no worse underground than above ground - and can be overcome by using large enough wires, and stringing them in pairs, twisting them together. The induction is thus neutralized. The telephone company is to-day buying its wires so twisted.

"The 6,000 miles of underground wire is carried in 170 miles of two and three-inch pipes. The system is practically complete on the south side, and only a few aerial wires are to be found along the railway tracks.

Every wire will be down on the north side by the close of the year. The city has to-day 53 miles of electric light wires, and every inch of these out of sight."

The Professor explained why long distance telephoning was not thus far a grand success between cities. A metallic circuit is an imperative necessity, and this has not yet been thoroughly well arranged for. Then, too, the carrying capacity of the wires must be as nearly perfect as possible. One bad joint may do a deal of mischief in the way of obstruction, and the local lines are liable, at least, to have high resistance joints or imperfect contacts. It will all come by and by, when proper construction has done away with the induction troubles, silenced the rattling joints, and taken out the abnormal resistance. Then it will be as easy to talk to a distant city as it is now to talk within the city limits.

Milwaukee Railway.—The ordinance granting a franchise to the Hinsey Electric Railway Company passed the City Council and was signed by Mayor Brown, after very carefully considering its provisions for a large portion of the day on the 12th.

The franchise permits an electric railway from the Northwestern Railway station to the northwestern portion of the city. There are very few telephone wires in the locality where this line of magnetic provokes can reach them.

The Telephone Boys and their Ladies.—The excursionists on their way to Minneapolis were royally entertained by the Chicago and Central Union Companies here. The lunch was elegant, day was beautiful, the route was well selected, and the drive was as pleasant as it was startling to many of the visitors. Chicago was pronounced quite a nice place by the many who had never seen it before The drive was along the lake shore through Lincoln Park.

Electrician Missing.—Mr. Robert Mackie, superintendent and electrician of the Fort Wayne Jenney Company, left that place last week for Cooperstown, N. Y., where he was to be wedded to Miss Mary B. W. Sterre, on Wednesday last. The wedding was to be quite extensive, over 200 invitations having been issued. Monday Mr. Mackie left Cooperstown for Troy on business, and up to Friday evening his friends had no tidings from him. He is a member of the Chicago Electric Club, a favorite where known both as a business and a social acquaintance. It is now reported on good authority that Mr. Mackie is in Canada.

Chicago, Sept. 14, 1889. C. C. H.

OUR BOSTON LETTER.

Vacation Tours.—Vacation days are about over, and browned faces and other evidences of renewed health and strength appear on all sides. This is just the time that we, who left in the comparatively cool days of August, inwardly exulting over those left behind at office desks, are now made to suffer the penalty of our erstwhile joyousness, as we now bid goodbye to these self same persons, who were wiser than they knew and are now enjoying their outings, while we are suffering the effects of these sultry September days. The electrical people of New England, from being largely located at or near the seaboard, seem to have a liking for mountain air and scenes, when they seek, in a week or two of leisure, rest from a year's arduous toil, and recuperation for the even increased efforts of another year. Among those run across in a delightful trip through the White Mountain region were Mr. A. D. Newton, of the Eddy Motor Company, who was in great demand at Bethlehem, and to whose efforts the success of the Sinclair programme on "Coaching Day" was largely due; Mr. Hollon C. Spaulding, of the T.-H. Motor Company; Mr. H. D. Sears, of the Thomson Electric Welding Company; Mr. G. F. Curtiss, of the Thomson-Houston Company, and Mr. G. F. Steele, of the Sprague Electric Railway and Motor Co.

Work of the Wright Engineering Company.—The outside construction entire for the new plant at Rockville, Ct., is being done by the Wright Electrical Engineering Company, of this city. One hundred and ten arc lights are being installed, of which 74 are public city lights. The same company are also doing some interesting underground work on Mr. Alex. P. Wright's system, at Narragansett Pier, R. I., and have finished the installation of the plant in the island of Nantucket, Mass., which has been formally started and is giving entire satisfaction.

Telephones vs. Electric Railways.—The Hoosac Valley Street Railway Company, of North Adams, and the New England Telephone Company are having a little controversy over the interference with the telephone service in that town caused by the electric power wires of the railway company. Hearings have been held before the selectmen, at which testimony has been given by Mr. Cargill of the T.-H. Company, Electrician Hopkins of the railway company, and Mr. I. H. Farnham of the New England Telephone Company. No decision has been reached, and the selectmen are to visit a road run on the single trolley system before definite action is taken.

Two Companies Too Many.—On the appeal of the Middleboro Electric Light and Power Company from the decision of the Middleboro Selectmen, who granted a second franchise to the Middleboro Gas and Electric Company, the gas commissioners have rendered a decision sustaining the appeal, and revoking the franchise of the latter company.

Discussing the Van Choate System.—At the meeting of the Brockton Commercial Club last Monday evening a large number of the representative business men of the city were present to hear the report of the committee, consisting of Judge Day, Representative Thompson, Capt. R. B. Grover, W. C. Flagg and D. S. Packard, appointed to investigate the Van Choate system of electric lighting with an idea of introducing the manufacture of its apparatus as one of the industries of the city. The committee's report was decidely favorable, and it will not be surprising if Brockton includes this line of manufacturing in its varied enterprises within a short time.

The West End Company in Brookline.—The selectmen of Brookline gave a hearing Wednesday evening upon the petition of the West End Street Railway Company for leave to put in the overhead electric system for its lines in that suburb. But little opposition was manifested and the general belief is that the West End Company will be granted all it asks.

Power for the Cambridge Line.—The electric cars on the Cambridge line obtain current from the station of the Cambridge Electric Light Company. The station was not intended for the continuous work that has been put upon it and will cease furnishing current for the cars, it is now said early in November. If in the meantime a new station is not built, the Allston station will probably then furnish the necessary current.

Delinquent in Law.—Wednesday, the 11th, was the last day allowed by law, on which all returns to the State gas commissioners from the electric light and gas corporations could be received. On Thursday returns were wanting from 53 electric companies and 31 gas companies, which means that but one-third of the electric companies and one-half of the gas companies complied with the law in this requirement.

A New Engineering Office.—The Hill Clutch Works, of Cleveland, have opened an engineering office at 146 Franklin street, corner of Congress, in the Cook building. Mr. L. J. Hirt will be in charge of the office, which will do a general engineering business in the specific line of the company in arranging power transmission machinery. This step has been rendered necessary by the large business the Hill Company has built up in the New England States.

T. W. S.

Boston, Sept. 16, 1889.

OUR WASHINGTON LETTER.

Active Electrical Workers.—Two railroads are about to make use of electricity as a motive power. One has contracted for a full Thomson-Houston plant. An arc light plant is in course of erection at the Navy Yard. Forest Glen, a beautiful suburban place, has recently put in the electric light. Even the old burgh of Alexandria has awakened from its slumber and is following suit. The local electric lighting company is busy drawing wires through conduits and putting down new conduits. News comes that the long distance telephone will soon reach here. Quite a good showing for the dull place that Washington is reputed to be.

Lighting the White House Grounds.—Last winter Congress made an appropriation for the maintenance of ten arc lights, to be placed about the President's house and grounds. The poles have been erected and the work approaching completion. Some have been placed on the $\frac{5}{8}$ mile oval south of the "White Lot." This is the place where the local bloods show the speed of their fast horses, when the police are not around. This will be quite a convenience to them.

Poor Gas Light.—The commissioners are about to jump on the Georgetown Gas Light Company. It seems that this company have the contract for lighting the streets of Georgetown. It appears that the citizens have made complaint to the commissioners that the illumination was insufficient. The board sent an officer to inspect and report. Captain Lusk, who has charge of the lighting, personally investigated the matter and made the following report: "Examinations and tests have shown that the complaints which have been filed are well founded in the case of quite a number of lamps. Where the contract calls for six-foot burners many of the lights show a consumption of three feet per hour or less. I therefore recommend that the Georgetown Gas Light Company be informed that the street lighting performed by them is not in the above respect 'to the satisfaction of the commissioners as required by the contract.'" G. E. M.

Washington, D. C., Sept. 6th.

Waterford, N. Y., has petitioned for electric cars. Property owners representing $230,000 are in favor of the project, while the opposition represents but about $22,000.

The Telephone Convention.

NOTES BY THE WAY.

From Chicago to Minneapolis the telephone special went over the new line of the Chicago, St. Paul & Kansas City Railway Company. The trip was made on time, was a very pleasant one, and Mr. R. S. Hair, the general Eastern passenger agent, who went from New York to see that the travellers were made happy, received many compliments over the excellence of his line.

After leaving Chicago, a minstrel troupe was organized by Messrs. Hibbard and Thayer, with Platinum Baker as middle man. The audience survived after nearly two hours of enjoy——of attention to the work of the artists.

The opinion is universal that Mr. Charles J. Glidden is a most considerate and liberal host, and both he and General Manager McKinstry are to be congratulated over their success in making all the varied parts of the enjoyable and unique entertainment fit in so nicely and conveniently.

Secretary Barney received many deserved compliments over the success of the special train, and deserves them all, for few realize the work necesssary to so satisfactorily arrange and carry through the securing and filling up of a complete special train to go from New York to Minneapolis—a distance of 1,500 miles. This achievement no doubt greatly increased the attendance.

There were more ladies at this Convention than ever before, and they will all be at the next one!

The magnificent business houses in both Minneapolis and St. Paul, built in modern architecture, surprised the Eastern delegates, who for the first time saw the prairies of the West. And then there was no end to the beautiful, and, in many instances, palatial homes. These are two great modern cities.

Editor Kreidler, of the *Western Electrician*, entertained his journalistic brethren from the East at an Electric Club lunch in Chicago.

Mr. J. W. Marsh, secretary of the Standard Underground Cable Company, came in from Pittsburgh to attend the Convention.

The Pennsylvania railroad was represented by Mr. H. M. Haines, of the passenger department, who faithfully looked after the comfort of all.

Mr. C. J. Reilly's invention, relating to the transposition of metallic circuits for underground work, was presented to the delegates in the form of an illustrated circular, which every telephone man carried away with him to investigate.

The Beach-Cooke new telephone switchboard was the cause of much inspection on the part of the telephone men. It was described in the REVIEW last week.

A number of the telephone men were interviewed by the Minneapolis press, the one that attracted the most interest being with Mr. A. S. Hibbard about long distance telephoning.

President Sargent had the distinction of having his picture appear in the local press. It is thought he may recover.

Dr. Gustav Wabner, of Berlin, made a most favorable impression, and was courteously received by all.

In addition to the ladies mentioned in the REVIEW last week, a number were present from the West and South. Among these was Miss Grace Knight, of Austin; Mrs. H. N. and Miss Gifford, of Louisville; Mrs. F. G. Beach, of Chicago; Mrs. Col. J. J. Dickey and Mrs. L. H. Korty; and Mrs. Capt. Geo. N. Stone, of Cincinnati.

The telephone delegation enjoyed a visit to the State Fair, and surprised the Western farmers with their knowledge about big vegetables, live stock and draught horses.

There was much uneasiness on account of the reports about the storms in the East.

Mr. M. F. Tyler returned to New Haven a day earlier on learning of the fire in his exchange.

A message from New York City, via long distance telephone wire to Buffalo, was received by A. S. Hibbard. It is supposed that the telegraph wires out of New York were not working.

The Postal and the Western Union Telegraph Companies both did a large business as soon as it was announced that they would send personal messages free. It was a very nice thing for the companies to do, and the wearers of the telephone buttons—which distinguished the delegates from common people—greatly appreciated the courtesy.

Ninth Annual Convention of the United States Military Telegraphers' Corps.

On the 13th inst. at Louisville the United States Military Telegraphers' Corps and the Old-Time Telegraphers' Association held their ninth annual convention.

The two organization are distinct, but they usually hold their annual meetings together, and many telegraphers are members of both associations.

The Military Telegraphers convened in the Louisville Hotel, Wednesday morning at 10.30 o'clock, with President W. R. Plum and Secretary J. E. Pettit, of Chicago, in their respective places. Vice-president Geo. C. Maynard was absent. A few of those present were: Mr. Wm. B. Wilson, general freight agent of the Kensington district of the Pennsylvania Railroad, of Philadelphia; J. H. Emerick, general superintendent of the Eastern division of the Postal Telegraph Cable Company, of New York; R. J. Hutchinson, superintendent of telegraphing of the New York Stock Exchange; Wm. J. Dealy, manager of the Western Union at New York; J. J. Callahan, a famous New York etcher; R. B. Woolsey and R. A. Taylor, of Terre Haute; Charles Newton, of Frankfort, Ky.; William Finnegan, J. F. Cleverdon, Joseph Knittle, Lant Jones, T. B. Fullen, John Brant, Senator W. L. Ives, R. J. Stevenson, George E. Holbrook and E. Delaney, of New York; D. A. Williams, of Kansas City; Sol. Palmer, superintentendent of construction of the Western Union, St. Louis; S. B. Fairchild, of St. Louis; W. L. Biggert, of Jeffersonville; E. Rosewater, editor of Omaha *Bee*.

President Plum read his address reviewing the history of the services of the military telegraph operators.

Mr. D. A. Williams, of Kansas City, presented the report of Mr. Woodring, of Kansas, who attended the G. A. R. encampment at Milwaukee, and secured the adoption of resolutions indorsing the claims of the United States military telegraphers to Congressional recognition. Mr. W. B. Wilson, of Philadelphia, arose and said: "We are engaged in an effort to obtain national recognition from the Congress of the United States, and for that purpose we need money. I do not mean for corrupt purposes, but money for legitimate expenses, necessarily incurred in putting the proposed measure through. We need probably $2,000. We ought to raise it. I will pledge myself for one to give $50 between now and Christmas. Let us hear from others." A motion was carried that a committee of ways and means be appointed to conduct the business before Congress. The chair appointed Messrs. W. B. Wilson, of Philadelphia; H. W. West, of Chicago, and D. A. Williams, of Kansas City. A motion was then carried that when the military corps adjourned it do so to meet again in Washington, D. C., during the session of Congress, so that as much pressure as possible might be brought to bear upon that body. This adjourned meeting at Washington is not to interfere with or affect the annual reunions. The meeting then adjourned.

The Old Time Telegraphers' Association assembled at 2.30 o'clock P. M. at the same place. The attendance was full. President Chas. E. Taylor, of Frankfort, Ky., and Secretary W. J. Dealy, of New York, were in their places, but the vice-president, Day K. Smith, of Kansas City, was absent. The president's address was heartily applauded. A motion was made and carried that the address be received and constituted a part of the archives. A committee was appointed to draft resolutions upon the death of Geo. W. McCann, of Meridian, Miss., and Mrs. M. H. Ogle, the brave woman drowned at Johnstown, Pa. The following gentlemen were received into membership: J. H. Lounsberry and J. F. Cleverdon, of New York; W. W. Burhans, of Washington; W. A. Harris, of New Haven; A. J. Porter, of Louisville, and James Faulkner, of Hoboken, N. J. The next meeting was fixed for Kansas City in the second week of September, 1890. The session was then adjourned.

In the latter part of the afternoon both associations were entertained by the Commercial Club and hauled about the city. The joint banquet took place at the Louisville Hotel Wednesday night. Thursday morning all the telegraphers departed for Mammoth Cave on a special coach tendered by Vice-President Milton H. Smith, of the Louisville and Nashville Railroad. The party went the long route and returned to Louisville Friday at noon and dispersed for their various homes. B. A.

Louisville, Ky., Sept. 13, 1889.

Telephonic News

⁂ The Long Distance Telephone Company is now at work at Easton, Pa.

⁂ Telephonic and telegraphic communication was largely interrupted in Newark, N. J., last week, the effect of the storm.

⁂ The long distance line between Leadville and Denver, Colo., elsewhere alluded to, has been finally opened and conversation between these two distant points carried on in a whisper.

⁂ The Sunset Telegraph and Telephone Company will put in a telephone plant at Ellensburg, W. T., at once. An electric street railroad is now under construction at the same place.

⁂ The Bell Telephone Company has filed a suit in the courts at Cincinnati asking heavy damages from the two electric street railroads in the city, and that they be compelled to so change their electric plant as not to injure the Bell Company. This will be a test case.

⁂ There is a strong probability that the telephone wires will be put underground in Erie, Pa. There is soon to be a conference of telephone managers and superintendents, at which the subject will be debated, and it is quite probable the decision will be reached that the wires must go underground.

⁂ The electro-magnetic telephone invented by Captain Zigang is based on the principle that when a telephonic membrane is acted upon by an undulating current, through the intermediary of an electro-magnet, the currents obtained are, up to a certain limit, more intense and more distinct as the size of the membrane is limited and its elasticity increased.

⁂ The Southern New England Telephone Company, which has been rapidly pushing its metallic circuits all over the State of Connecticut has nearly extended its lines to all the principal towns. On Saturday afternoon Danbury was added to the circuit, and it will be but a short time before Superintendent Baker has his new lines everywhere in the State.

⁂ In the United States Circuit Court at Boston, last week, in the case of the United States of America *vs.* the American Bell Telephone Company, Judge Colt gave a decision authorizing the defendant company to withdraw its answer, and to file the same plea and answer in support thereof which has been filed by Bell. Judge Colt says: "While it must be admitted that a motion to withdraw an answer and substitute a plea is rare in equity cases, still, taking into consideration all the circumstances as presented in this case, I am of the opinion that the justice and convenience of the case will best be promoted by having the issues proceed *pari passu* as to each defendent.

⁂ A special meeting of the stockholders of the American Bell Telephone Company was held in Boston Thursday, to accept the act authorizing the company to increase its capital stock and to consider and act upon the question of making such increase and the number of shares therein. President Hudson presided, and Philip S. Stone was elected clerk *pro tem*. It was voted, on motion of Howard Wyman, to accept the act authorizing the increase of the capital stock of the company. Mr. Alexander Cochrane moved that the amount of the capital stock of this company be and the same is hereby increased from $10,000,000 to $12,500,000, and the number of shares therein from 100,000 to 125,000, each of the par value of $100, and that the directors do give notice in the manner prescribed by law to the stockholders of record the day of such increase, and of their right to take shares at par therein in the proportion of one new share to four old shares held by them respectively, such shares to be paid for in cash and issued at such times as the directors may determine, and that all shares not so taken be sold or issued by the directors for cash, at not less than par, in such manner as they shall determine. The motion was carried by an unanimous vote.

PROCEEDINGS.

(*Continued from page 1.*)

1888, the Cumberland Telephone and Telegraph Company and the East Tennessee Telephone Company were dropped from the roll of active membership, by vote of the executive committee, to whom their resignation had been referred, by vote of the Association. The Clark Insulated Wire Company, having ceased to exist, was also dropped from the list of honorary members.

At the same meeting one new associate member was elected, viz: The National Conduit Manufacturing Company, of New York.

One of our most esteemed honorary members has died since the last meeting, Mr. George L. Phillips, who was the first president of this Association, and has always been one of its most active and interested members. It is most fitting that this meeting, as it undoubtedly will do, should take appropriate notice of the loss which it has sustained by his decease.

These changes leave us at the close of the year a membership as follows: 34 active, 6 associate and 28 honorary members.

There is now in the hands of the secretary the resignation of the Sunset Telephone and Telegraph Company, of San Francisco, from the list of active members. The company takes this step because it has virtually consolidated with the Pacific Bell Telephone Company, which is already a member.

Mr. Clark B. Hotchkiss, on account of ill-health and virtual retirement from business, tenders his resignation as an associate member.

I respectfully recommend that both these resignations be accepted, and also that the name of the Callender Insulating and Water-Proofing Company, which has failed and gone out of business, be dropped from the roll of honorary members.

One new application for associate membership is in the hands of the secretary and will be presented in the proper order of business.

The office of the secretary remained at No. 18 Cortlandt street, until March 1st of the present year, when it was removed to No. 510 West 23d street, where it is now located.

There has been little change in the routine business of the office during the year. The "News Letter" has been issued twice each month and the usual number of inquiries for information have been replied to, and the information furnished whenever practicable.

The secretary takes this occasion to emphasize his repeated requests that the members of the Association will keep him promptly advised of any and all matters of telephonic interest occurring in their respective localities. The furnishing of such information will greatly enhance the usefulness of the permanent headquarters of the Association.

The secretary has had the pleasure of visiting the following exchanges during the year, viz: Boston, New York, Brooklyn, Philadelphia, Pittsburgh, Washington and Providence.

As will be seen by the report of the treasurer, the expenses of the Association have been kept within its income, and the balance of the cash on hand at the beginning of the year has been slightly increased, there being now in the treasury the sum of $66.41. All dues have been collected to date, and all bills paid. The Association neither owes anything, nor does anybody owe it anything.

The income of the year was derived from the following sources:

From annual dues	$2,000 00
" initiation fees	10 00
" sales of extra copies of proceedings	15 37
Total	$2,025 37

The distribution of the expenses is as follows:

For salary of secretary	$1,200 00
" rent of office	75 00
" printing proceedings N. Y. meeting	258 00
" other printing, News-Letter, circulars and blanks	135 80
" office expenses, stationery, postage, telegrams, express and newspaper subscriptions	138 21
" stenographer at New York meeting	95 00
" other expenses at " "	58 80
Total	$1,980 81

It is reasonable to estimate that the income for the ensuing year will, as has been the case for several years past, be just about sufficient to meet the current expenses.

Respectfully submitted,
C. H. BARNEY, *Secretary.*

The President: Gentlemen, you have heard the report of the secretary. What is the pleasure of the Association?

Mr. Storke: I move the report be accepted and placed on file.

The question was here seconded, put and carried.

The resignations of the Sunset Telephone-Telegraph Company, of California, and Mr. Hotchkiss, of New York, were accepted. The former company has become part of the Pacific Bell Company.

Judge Atwater, of Minneapolis, who represented the city and also the Board of Trade, and who was there for the purpose of welcoming the visitors to the city, was introduced and spoke as follows:

Judge Atwater: Mr. President and gentlemen of the National Telephone Exchange Association: I had hoped that our worthy Mayor, even our Governor, perhaps, would have been here to represent our city on this occasion. I learned since that some accident had detained our Mayor. For one I believe that it is only simple courtesy, and I know it is the heartfelt feeling of all our citizens to give you a most cordial and hearty greeting to our city. (Applause.) Perhaps, gentlemen, I am hardly worthy to do it, and yet not entirely unworthy, I flatter myself. For 40 years ago in October coming, I landed on this bank of the Mississippi River—I should say the eastern bank, because at that time there was not a building on this side of the river. But I have been here all that time more or less. Gentlemen, we feel honored that an association such as yours, that is known all over the United States, would have selected this city as the place for your deliberations on this occasion. You do us honor, gentlemen, and we cannot give you too warm or too cordial an invitation here. Gentlemen, the great science, the great invention, the progress of the invention which you represent now practically controls the world. No man doing business can live without the aid of that great invention which you represent (applause) and I know you worthily represent. I take it for granted that you are here to-day to consult on measures that will facilitate the business of every man in this United States. (Applause.) I presume that you are here without any pecuniary interest in view. You are spending your time, your money and ability, that you can give, to perfect that which we all depend upon in doing our business. We ought to be honored when gentlemen of your, I may say intense, application, your little leisure for enjoyment—we ought to be honored, when you will come here to make the results of your labors more efficacious, better for the whole public, better for our own city. Again, Mr. President and gentlemen of the Convention, on behalf of the Board of Trade of this city, on behalf of the Mayor, nay, I know I speak the sentiments of this city, when I say in behalf of all the citizens of this city, we bid you thrice welcome. (Prolonged applause.)

The President: It gives me great pleasure on behalf of the members of the Association to return to you their thanks for the very kind and cordial welcome that you have extended to them. Being here in the pursuit of a useful business, we have come to discuss matters pertaining thereto, and when we have discharged our duty, we no doubt shall leave your great, enterprising and beautiful city with pleasant recollections of our brief sojourn among you. Your city, standing on the banks of that mighty river of which it is said by one of the greatest men "that it rises where it never thaws and flows where it never freezes," we greatly enjoy visiting. (Applause.)

The Treasurer: I beg to present to the Convention a detailed statement of the receipts and disbursements for the year, and which agrees with the summary just presented by the secretary. All the members of the associations from whom I should have collected dues have paid, and I have vouchers for all disbursements which I present with this report and which in the regular order of business, as I understand it, will go to the executive committee. The balance is $66.41.

The report was accepted and placed on file.

The secretary here read the minutes of the executive committee.

The secretary then read the following invitation:

August 15th, 1889.

To the National Telephone Exchange Assn.

Gen. C. H. BARNEY, Secretary.

Dear Sir:—The Northwestern Telephone Exchange Company takes pleasure in extending to the members of the National Telephone Exchange Association and their ladies, an invitation to a carriage ride at Minneapolis, a visit to Minnehaha Falls, carriage ride at St. Paul and dinner at the Hotel Ryan, St. Paul, on Thursday, September 12th, 1889. Carriages will leave the West Hotel at 9.30 A. M.

LEVI SPRAGUE, Prest.

Mr Stone: I move, Mr. President, that the invitation be accepted with thanks.

The motion was carried unanimously.

The Secretary: There is one other letter, Mr. President, as follows:

Minneapolis, Minn., Sept. 10, 1889.

To the Members of the N. T. Association:

Gentlemen—A cordial invitation is extended to you all to visit our electric light station foot of Third avenue, office No. 11 Washington avenue.

Minnesota Brush Electric Co.
By S. S. LEONARD, Gen'l Manager.

The President: You have heard the invitation, gentlemen.

The Treasurer: I move the invitation be accepted with thanks. Carried.

The President: The next business before the Association is the election of officers. The officers to be elected are the president, vice-president, treasurer, and executive committee, and one member of the board of advisory committee. Nominations are now in order.

Mr. W. D. Sargent, of Brooklyn, was nominated by Mr. Glidden for president and was unanimously elected. Mr. Sargent was escorted to the Chair and introduced by the retiring president as one as able as he was modest. Mr. Sargent said: Gentlemen, I do not feel that I can make a speech that would be fitting and that would express the high appreciation I feel for the honor you have conferred upon me. Thanking you for the honor, gentlemen, we will proceed to business. (Applause.)

The President: The next business in order, gentlemen, is the nomination for vice-president.

Mr. Stone: I desire to place in nomination for vice-president one of the old standard bearers, a gentleman so well known by every member that he needs no recommendation. I name for vice-president of this Association Mr. F. G. Beach. (Applause.)

Mr. Beach was unanimously elected, and came to the platform amid applause and spoke as follows: Gentlemen, I am no speech maker, but thank you for the compliment. I will only say, take a drink. (Laughter and applause.) (The waiter of the hotel had just brought in three large pitchers of ice water and set them on the table in front of the platform.)

The President: The next business in order is the election of the treasurer.

There were numerous calls for Mr. Storke.

Mr. Easterbrook: There seems to me no other name, and I ask unanimous consent that the secretary be allowed to cast the ballot for Mr. Storke as the treasurer for the ensuing year.

The question was seconded, put and carried.

Mr. Storke: I thank you, gentlemen, for this compliment to a tried and faithful officer. (Laughter.) It is an old saying, and one in which we all believe, that "money talks." If it is true, $66.41, the balance in the treasury cannot have much to say. (Applause and laughter.)

The President: The next business, gentlemen, is the election of an executive committee, of which there are four members. The retiring members are Geo. N. Stone, Cincinnati, Ohio; Samuel M. Byran, Washington, D. C.; W. J. Denver, Boston, Mass.; C. F. Cutler, New York City.

Messrs. Cutler, C. H. Wilson, Gifford and Levi Sprague were elected members of the executive committee.

The President: In place of Mr. Gifford of the advisory committee whose term expires this year a nomination will be in order. The remaining members are Mr. E. J. Hall, Jr. and Mr. M. F. Tyler.

Captain Geo. N. Stone, of Cincinnati, was elected member of the advisory committee.

Mr. M. F. Tyler: Before we proceed to our regular business, the topics, etc., and the discussion of them, which really is the cause of our coming here, I wish to refer to a passage in the secretary's report and to suggest action thereon. I refer to the death of Mr. Phillips. It has been our fortune in the history of the Association, or rather I should say our misfortune, to lose two of our presidents—the two earliest ones. But I think that nothing could have occurred in the history of the telephone business that could come more closely home to each individual who has been associated in our association work than the death of Mr. Phillips. I cannot stand here, sir, and talk about it for any length of time. He was my personal friend, as I believe he was the personal friend of every man in the business who knew him. And to think that with that splendid physique, with that splendid energy, with his heart in the business, and with the brain he had to give to it, with the opportunities he had for its improvement

and developement, that this should all have been cut off thus suddenly, and it seems to us mortals so needlessly, it is something I cannot talk about. But I think, sir, it is no more than fitting that the Association should put upon record their expression of what he was to the business, and also express their regret. I beg to offer some resolutions which I have been asked to draw up. I feel, sir, they are not what they should be, and shall be only too pleased to receive suggestions or amendments. In fact I do not know, but I think they should be referred to a committee for review. But they are as they are, and as it came to my mind this morning.

WHEREAS, Since the last meeting of this Association we have lost by death our ex-president, Geo. L. Phillips,

Resolved, That this Association regards the death of Mr. Phillips as at once a most serious loss to the business in which we are all engaged, and a great bereavement to this body. Prominent as he was in its organization, efficient and capable as its first president, active and sagacious in its subsequent deliberations, he more than any other man stood for and represented this Association. In its connection with the general business only those directly associated with him can fully appreciate his unflagging energy, tact, foresight and devotion to its advancement. His heart as well as his brain were in it.

Resolved, That this Association further takes this opportunity of recording its esteem and affection for Mr. Phillips as a man. He will be missed as a personal friend by all its members, and his death has been felt by each to be a private grief. The Association feels that it can no better express its feelings at his death than by the simple words, "We loved him."

Resolved, That the secretary convey to Mr. Phillips' family the expression of our deep sympathy with them in their loss, together with a copy of these resolutions.

Mr. Metzger: I think that Mr. Tyler has in fitting terms expressed the feelings of regret which we all experienced at the death of this member of our Association, who stood so close to us, Geo. L. Phillips, the first president of this Association. And I therefore move that these resolutions be engrossed upon the minutes of the Association, and that they be adopted as the sense of the Convention.

Mr. Lockwood: I will take upon myself to say one word on the part of the honorary members. I have known Mr. Phillips as a telephone man perhaps as long as any one here, and in common with the rest of you it did not take me long to appreciate the sterling virtues of the man as well as the sterling ability he displayed in the telephone business. I feel that I for one experienced a personal as well as an associate loss. Although, as I have said, I knew Mr. Phillips early and loved him, it was not until the last few years that I became intimately associated with him—not until he took active charge of the Chicago Telephone Company. I recollect with pain the impression that prevailed in the office of the American Bell Telephone Company all around when we heard of the sickness, and of the little chance that he had for recovery, and while we hoped against hope, still there was a kind of foreboding feeling from the first that it was against hope. I join most heartily in the sentiments expressed in those resolutions, and I second the motion.

Mr. Carson: As one of the members of our first Convention at Niagara Falls, where I first met Mr. Phillips and where he made an impression upon me which I never can forget, I desire to add just the word of concurrence with the expressions in the resolutions presented by Mr. Tyler. I did not know Mr. Phillips intimately and personally, and therefore it seems to me that the impression that I can express more fully demonstrates the personality and power of the man, making himself felt upon all his associates. He was so cordial; he had such a big heart that one could not have any association with him without feeling impressed by more than ordinary impressions. I desire, therefore, to add a second to the motion for the adoption of the resolutions. And I would like, sir, to move further, or as an amendment, that the action on them be taken by a rising vote.

Mr. Jackson, of Chicago: I am not perfectly familiar with the rules of this Association, but I have an impression that associate members are not entitled to the floor, and yet I trust that I may be pardoned by this Association if I ask that privilege for just one moment, because Mr. Phillips was one of the most valued and one of the oldest directors of our company, and a man whom we not only respected for his eminent business ability, but to whom personally we were devotedly attached. And I recollect how well last January, when I lay very sick myself and the news of his severe illness came to me, how like a great burden it was. I recollect the keen pain that came to me when I heard he had passed away. I want to say that Mr. Phillips was not only a man who understood his duties to the stockholders and had the ability to perform them, and who understood his duties to the public and had the ability to perform them also, but a man who understood his duties to the employés under him and knew how to perform them. It was only last Sunday evening that I was speaking to a lady of prominence in Chicago, socially and in every good work, and she was telling me how Mr. Phillips came to her at the time of the fitting up of the new building of the Chicago Telephone Company and requested that she and one or two other ladies would help him with their advice as to just how to make the quarters there the most comfortable for the young lady employés, and spoke of his plans for their comfort and welfare and advancement. As we spoke of that incident in his life we felt we were spending our Sunday evening most appropriately. Therefore, Mr. President, I desire to second these resolutions.

Mr. Cherry, of Cincinnati: I wish to say one word in behalf of the Association, and also as one of the old pioneer members, a few there are left among us here who elected him as the first president. I, as well as Mr. Tyler, feel the loss personally, as I know we all feel, and I simply want to add this word to his memory.

Mr. Wiley Smith: I, too, am unwilling to let this hour pass without a word as to Mr. Phillips' memory. I have known him long and well. I knew him before the telephone business. When we heard of his death we felt that a great light had gone out, and even now feel that the gloom is still upon us. I most heartily add my second to the resolutions.

The president, Mr. Sargent: Gentlemen, you have heard the resolutions offered by Mr. Tyler. I wish to state that I too made Mr. Phillips' acquaintance at the first meeting of this Association, and became, as we all did, a warm personal friend of his. I think on occasions like this that the words spoken cannot convey our appreciation as fitly as they should, but we can at least express as best we may, and I therefore take pleasure in putting the question. Also as a fitting tribute to the memory of Mr. Phillips, I think that the suggestion of Mr. Carson that the vote be taken standing is a very good one. All therefore in favor of the adoption of these resolutions will express same by rising.

The vote was taken, all present rising to their feet.

The Secretary: The first thing I have to present, Mr. President, is another application for membership, which has come in since that order of business was disposed of, or rather it is an application for re-instatement.

Dear Sir: I am requested by Prest. Duncan, of the Cumberland Telephone Company, to make the application of the Cumberland Telephone and Telegraph Company for re-instatement to membership of the National Telephone Exchange Association.

Yours truly,
J. M. BROWN.
One of the Board of Directors of Cumberland Telephone Company.

Mr. Stone: I move that that application be referred to the executive committee. I believe that is the proper reference.

The motion was seconded, put and carried.

The Secretary: I have a letter here from Messrs. Chas. A. Pillsbury & Cox, Minneapolis, Minn.

The secretary read as follows:

Minneapolis, Minn., Sept. 10th, 1889.

Dear Sir: We take pleasure in extending to the members of the Convention and telephone managers the hospitalities of our mill "A." We shall be pleased to meet them there at any hour they may designate.

Very truly yours,
CHAS. A. PILLSBURY & CO.

The President: What is your pleasure, gentlemen, with this invitation.

Mr. Metzger: I move the invitation be accepted with thanks of the Association and referred to the executive committee to arrange the details. Carried

Adjourned to 3 P. M.

TUESDAY AFTERNOON SESSION.

The Convention was called to order by the President at 3 P. M.

Mr. Lockwood: Before proceeding with the business of the Association, I would present to you and to the Association, Mr. Gustave Wabner, the gentleman in charge of the telegraphic and telephone department in the city of Berlin. This gentleman has heretofore been in various countries, and has experienced courtesies from telephonic and telegraphic officials of the various companies and governmental organizations, and we all know how pleasant it is to be cordially met in foreign lands. I have been requested by several gentlemen connected with the Association to ask, on behalf of Mr. Wabner, that he be allowed to participate in the privileges of the Convention during the meetings of this Association, and, if any motion is necessary to legalize these privileges, I hereby make the motion that these privileges be extended to Mr. Wabner.

The President: I think that all the members will join with Mr. Lockwood and myself in extending a very hearty welcome to Mr. Wabner as a representative of the German telephone system, and it does not seem that any motion is necessary in this Association except to extend to him the privileges of the floor during this meeting. I think that the members of the Association will unanimously agree to give Mr. Wabner these privileges. If there is no objection, I think we will consider that that is settled.

The Secretary: The first communication was received about five minutes after our recess at 1 P.M., and is from Mr. Tuttle, the general superintendent of the North American Telegraph Company, which has an office in the building:

The use of the Postal and our lines is respectfully tendered to the members of your Convention for all personal messages.

Yours,
H. E. TUTTLE, Gen'l Supt.

The Secretary: I would say that the young lady in charge of the office was instructed to allow the use of the line free to anyone who states that he is a member of the Convention, for the sending of personal messages.

Mr. Easterbrook: I move that the Convention extend a vote of thanks to the North American Telegraph Company.

This motion was seconded and carried.

The Secretary: The other communication is an official invitation from the management of the State Fair Grounds.

MR C. H. BARNEY, Secretary,
National Telephone Exchange Association.

We extend a cordial invitation to your body to visit our State Fair to-morrow, arriving here at 1 P. M., if agreeable to you. Answer quick.

WM. BUSHNELL, President.

Mr. Gifford: I just want to state one or two facts which occur to me and the Convention can do as they please. This is an invitation from a State organization—an organization representing the brawn and muscles of the agricultural interests of this State and it is worthy of our consideration. It is from men all over the State—representative men—and if it is possible for us to arrange to attend we should accept the invitation. I do not know what the programme is, but we ought to meet it with all possible courtesy, if we do not accept it.

The President: We think it is quite an honor to receive such an invitation from the representative body of citizens in this State, and that we should, if possible, accept that invitation, even if it became necessary to disarrange our plans as already formed, which are to have a session to-morrow afternoon. It would seem to me that this is the best action to take, if we could accept the invitation for to-morrow afternoon and then arrange for another session at night, or else we will have to extend the time to get through with the papers. I think the members of the Association would be honoring themselves as well as honoring this Association, by accepting that invitation, and going there in a body. If the Association will take such action as is necessary to carry out that plan I shall be very glad to put the question.

Mr. Hall, Jr.: I move that the invitation be accepted.

Mr. Gifford: We ought to arrange to accept this invitation and to go, even if necessary to allow some other things to go by. We either want to decline it on account of previous arrangements, or else to go in a respectable body so as to do ourselves credit and satisfy them.

The President: I think, as I said before, that we will honor ourselves, as I have no doubt they would consider that we will be honoring them by going as a representative body of telephone men, and the motion has been put, as I understand it, that we accept the invitation and proceed in a body to-morrow afternoon, the details of the arrangements to be perfected by the executive committee.

This motion was duly seconded and carried.

The President: The next business, it seems to me, would be to provide for another session, because if we lose the session to-morrow afternoon, it is going to cut short our time, and I imagine that many of the members have calculated to get away on Thursday night; so the Association may take such further action as they may think necessary.

Mr. Hall, Jr.: I intended in that resolution to cover all the arrangements that might be required, not only the arrangements for attending this Fair, but also providing such re-arrangements and other plans as might be necessary.

The President: If there is no objection on the part of the Association, the resolution will be considered as passed in accordance with the remarks just made by Mr. Hall, which will, of course, cover the whole question.

The Secretary: The executive committee have acted upon two applications for membership, that of Messrs. Felton and Guillame, manufacturers of telegraph and telephone cables and wires, Cologne, Germany, who apply for associate membership, also that of the Cumberland Telephone and Telegraph Company, who apply for active membership. The executive committee approve both applications and recommend their admission.

Mr. Easterbrook: I make the motion: Resolved, That the report of the executive committee be placed on file and these members be elected to the Association in their various capacities.

The President: The executive committee exercises a sort of censorship over the papers offered to this Association, and they are quite in harmony in feeling that it would be better for the Association to go at once into executive session on the subject of the papers that are offered at this meeting, and if a motion is put to that effect—

Mr. Metzger: I do not quite understand the Chair.

The President: The executive committee recommends that the Association at once go into executive session.

Mr. Metzger: I now make the motion that this Association go into executive session.

This motion was seconded by Mr. Lockwood, and carried.

The President: The meeting will now open in executive session.

The Convention then closed its doors to outsiders, and spent the afternoon listening to and discussing the paper prepared by Messrs. Hibbard, Carty and Pickernell.

WEDNESDAY'S PROCEEDINGS.

In addition to the reading of the papers published elsewhere, the following action was taken:

On motion of Mr. E. J. Hall, Jr., the secretary was instructed to send the cordial thanks of the Association to the following:

The Northwestern Telephone Exchange Co.; The State Agricultural Society, of Minn.; Minn. Brush Electrical Co.; Messrs. C. A. Pillsbury & Co.; North American Telegraph and Postal Telegraph Companies;

(*Continued on page 8.*)

Western Union Telegraph Co.; Chicago Electric Club; Chicago Telephone Co.; Central Union Telephone Co.

On selecting the place for the next meeting, several places were suggested, Detroit, Buffalo, Old Point Comfort and New Orleans, and were discussed by Mr. Crandall, Mr. Carson, Mr. E. J. Hall, Sr., and Mr. E. J. Hall, Jr., Mr. Eastabrook, Mr. Metzger, Mr. Wiley Smith and others, and upon vote Detroit was chosen as the place for next year and the date left to the executive committee. Adjourned *sine die*.

The Delegates to the Telephone Convention Entertained by the Erie Officials—The Toasts.

In addition to carriage rides over the cities of Minneapolis and St. Paul and a visit to the Falls of Minnehaha, a very elaborate banquet was given at the Ryan House, St. Paul, Thursday afternoon, September 12th, at 3 o'clock, by the Northwestern Telephone Exchange Company, belonging to the Erie interests.

Mr. Levi Sprague, president of the Erie Company, presided.

After the banquet Mr. Sprague rose and said: I am very glad to see so many of you together, and I bid you a happy welcome and hope it will be for our mutual benefit. I now have the pleasure of introducing Charles E. Adams, Esq., of the Northwestern Telephone Exchange, of St. Paul.

Mr Adams: Mr. President, ladies and gentlemen of the National Telephone Exchange Association: I think it is eminently proper that the ladies should be included at this time, as well as on all similar occasions. The committee of arrangements, on behalf of the Northwestern Telephone Company, congratulate you all upon the beautiful weather you have been permitted to enjoy during your brief stay within our domain. We also congratulate ourselves heartily that you have taken the opportunity of introducing to these two beautiful cities of Minneapolis and St. Paul, a class of men who have so largely contributed towards the success of electricity, and added materially to the wealth of this country, by perfecting methods of transacting business with rapidity and economy. An association which is composed of men of such ability as we see here cannot go astray in the selection of its officers, and the unanimity with which you chose your officers at this late convention, showed that there is perfect harmony among you and augurs well for the future. It is now my privilege and honor to introduce to you Mr. W. D. Sargent, of Brooklyn, the president for the coming year of the National Telephone Exchange Association.

Mr. Sargent: Mr. Chair nan, ladies and gentlemen: I am very proud indeed to respond for the Association; I am very proud to have been a member, during its entire existence, of an association that has done more, perhaps, than any other association in this country, for its development and for the benefit of the world and the general business. I am, as you are all aware, not gifted with any fluency of language at all, and it is my great regret that it is so, as it would be the highest pleasure of my life to be able to give expression to the kindly feelings that I have for the Association, and also to the high appreciation that the Association has for the hospitality which we have enjoyed here during the past few days. The Association has now been in existence about ten years. This, I believe, is the eleventh meeting. We have heard a great deal of these twin cities of the West, but as we viewed their splendor and grandeur today in our very pleasant drive, we feel, I think as did the Queen of Sheba on an occasion not very many years ago, that "the half has not been told." I think it was St. Paul who says: "Prove all things; hold fast to that which is good." Certainly, we have tried and proved the hospitality of the Northwestern Telephone and Telegraph Company to the utmost. We have tested the hospitality of the citizens of Minneapolis, I might say of the State of Minnesota, and we have certainly found that it was very, very good. I thank you for this opportunity to give expression to my feelings, and also those of the Association. (Applause.)

Mr. Adams: We have with us to-day one who represents a company whose territory not only covers this country but embraces the whole earth. I now have the honor of introducing with this sentiment,

"Reason, Remembrance, Wit, Invention, Art,
No nature but immortal can impart."

I have the honor of introducing Mr. Thomas D. Lockwood, electrician of the American Bell Telephone Company.

Mr. Lockwood: Mr. Chairman, ladies and gentlemen: It is very hard for such an obscure individual as myself to properly respond for such an organization. I regret very profoundly, and I am sure our fellow members in the Association also regret, that the executive officers of our company have not been able to be present with you. Some of you know why. Our president and general manager has just returned from several weeks in Europe. Our assistant general manager necessarily remains in Boston to confer with him upon his return, and our treasurer, Mr. Driver, was never known to let go of the reins for one moment; consequently he could not come. And so then it devolves upon me, obscure as I believe myself to be, and obscure as I am, to respond for the company. In some measure the choice is fitting, as with the exception of one gentleman, I am the oldest person in the service of the company present here. The gentleman who forms the exception is not here now, so I may mention his name, Major Brown. It would have been his duty, I think, to respond to "The American Bell Telephone Company." But upon such occasions as this he is like the immortal Nelson—you will recollect that before the battle of Trafalgar, Nelson sent out the famous signal, "England expects every man to do his duty"—upon such occasions as this Major Brown expects every man to do *his* duty. (Laughter.)

The telephone, as most of you know, was born in 1876. The number of the United States patent for the Bell telephone has become so historical in the minds of telephone men, that I think probably every man here who has paid any attention to the telephone litigation will remember it is 174,465. The oldest daughter of King Henry the Eighth used to say when they lost Calais, that when she died the name Calais would be engraved upon her heart. While I have not taken such a deep interest as that in telephone investigations, I am quite sure if ever I should die that number would be found engraved upon some portion of my brain. I do not think anybody now really doubts that Professor Alexander Graham Bell invented the telephone. A great many people have said, and I think myself it is true, that he never heard a telephone talk until after this patent was issued. I call to my remembrance another epoch in science. Some time in the earlier part of this century, or the latter part of the last, certain astronomers decided that by reason of certain indications in the orbit of the planet last discovered, Uranus, that there was another planet beyond. Nobody had ever seen this other planet and nobody had ever heard of it, but there was a French astronomer who, by suitable calculations which he worked out, and without any observation whatsoever, decided that the planet would be found in a certain place in the sky at a certain time. Not having the proper instruments for research himself, he wrote to a professor of Berlin, who pointed his telescope to the place and found the planet. It was Neptune. Analogically it would seem that the man who showed how to speak, through his knowledge of electricity, over an electric wire, and not the man who first did it, was the man who invented the telephone.

The first time this Association met there were 5,000 telephones in use; to-day there are over 350,000 in use in the United States alone. All of these have been manufactured by the parent company. Some of you may be aware of the fact that the American Bell Telephone Company, the parent company, is actually younger than some of its children, The American Bell Telephone Company was organized in 1880. Some of the sub-companies were organized before that, notably, the Telephone Construction and Maintenance Company of Detroit. The way it came about was this. When the telephone was first invented it was used for private lines for a little while. The Lowell men were some of the first ones to appreciate its importance, and they are among the directors of the American Bell Telephone Company to-day. The first telephones constructed were sent to Lowell, and Lowell, New Haven and San Francisco had the first commercial exchanges. There was not at first a company to exploit the instrument, but there was an association of the gentlemen interested. A few months later it was found that a more perfect organization was required in New England. Then the New England Telephone Company was organized—not the present New England Telephone and Telepraph Company, but the New England Telephone Company—to operate the states of New England, all the rest of the United States being operated by the Bell Telephone Company. These two later merged into the New England Bell Telephone Company, which later turned over its franchise to the present parent concern, the American Bell Telephone Company.

I might use lines of Longfellow to express, not only the troubles of linemen, but also the troubles of those who employ the linemen and who pay them:

"Borne down by their losses,
Weary of dragging their crosses,
Too heavy for mortals to bear."

I have no doubt every one of us have felt that way occasionally. I have no doubt the lineman has after a heavy sleet storm.

Mr. Chairman, on behalf of the American Bell Telephone Company, I return most hearty thanks for the hospitalities we have received in your two cities, and while we dearly love St. Paul, and what we read of it, we cannot help remembering that the other city begins with "Minnie," and whether it be Minne-apolis or Minne-something else, the name must touch a tender spot in all our hearts.

Mr. Adams: We all hoped to-day to have some one here to respond for the city of St. Paul, but owing to the fact that it is St. Paul's day at the Minneapolis State Fair (laughter), we find about everybody has gone to the state fair. Consequently we shall have to adjourn to Minneapolis.

The business organizations add largely to the prosperity of any city. Minneapolis is particularly fortunate in having an organization that is not only willing but energetic in promoting its interests. I have the pleasure of introducing Mr. W. D. Hall, secretary of the Board of Trade of Minneapolis.

Mr. Hall: I feel somewhat embarrassed, and I have to give three valid reasons why I am not able to make a speech to you to day. The first is that the members of this Convention with their wives and their daughters and their sweethearts—cousins—have been with us for three days. They have seen the city and a great many of its wonderful sights; they have become acquainted with a great many of the citizens, and I have had the pleasure of riding over both cities with them, and after thoroughly looking at them and examining them, I have made up my mind—this is honest—that their ladies are the handsomest and the men the most substantial and best looking—(hesitating) you know what I want to say—(calls of "modest") intelligent of any set of men that I have ever had the pleasure to meet, and therefore I think they are competent to judge of Minneapolis for themselves. That is my first reason.

My second reason is that I never can talk without singing Minneapolis's praises, and, according to responsible eastern papers, it is dangerous for a Minneapolis man to stand up in St. Paul and sing the praises of Minneapolis. That is my second reason.

My third reason for not attempting to make a speech is that I have had the pleasure for the first time in 11 years of riding over the city of St. Paul to-day. Since my last visit over the city, although I have lived within a stone's throw of it, Paul has grown so wonderfully that I made up my mind that Minnie was not so much larger than Paul that I thought she was. And I know that you have intelligence enough to form your own opinion of the two cities. (Applause.)

Mr. Adams: We have often thought that the gift of prophecy and mind reading must be pleasant property for those who possess them. The members of the press seem to be the only class of men who have a monopoly of those favors. From a positive declination to be interviewed they will produce a column article which will give your present, past and future. I have the following toast which I will propose to the press:

"Gentle or sharp, according to thy choice,
To laugh at follies or to lash at vice."

I now have the pleasure of introducing Mr. Charles W. Price, of the ELECTRICAL REVIEW, to respond for the electrical papers.

Mr. Price: Mr. Toastmaster, ladies and gentlemen: Until last evening the opinion prevailed among the members of the electrical press that our friends of the Convention desired to suppress us almost entirely. However, I am glad to have that opinion dissipated by your more liberal action later and this kind invitation. It is always embarrassing for me to respond to a toast before gentlemen; how much more, you can easily imagine, when ladies—of whom we married men stand in awe—grace the festive board. I think I may say on behalf of my associates of the press that we shall endeavor to present a faithful and accurate record of your actions, and abide by your wishes so far as we can consistently, and to present a report that we trust will satisfy you all. I desire to express my appreciation of the hospitality of our hosts this afternoon, both here and in the beautiful city of Minneapolis, and to express the hope that future conventions may be as pleasant socially and as profitable practically as this one has been. (Applause.)

Mr. Adams: I have a sentiment here which perhaps some of you will recognize:

"Men should press forward in furious, glorious chase;
Nobles look backward and so lose the race."

We have with us one here to-day who never looked backward, but steadily presses forward until he attains the desired result. It is my pleasure to present—not introduce—General C. H. Barney, secretary of the National Telephone Association. (Applause.)

General Barney: Mr. Toastmaster, ladies and gentlemen: At the risk of incurring the charge of divulging some of the secrets of our executive sessions, I may say that the papers presented before the meetings of the National Telephone Association, as a rule, sound very well. They contain, most of them, a good deal of truth, sometimes partially mixed with what some of us consider to be error. I think, sir, that this copy of Dryden's, which you have just read, may be opened to the same charge. While it sounds very well, it is certainly true that the electrical fraternity, perhaps more than any other class of business men, should press forward fast and furiously in the great strife of the business world, yet I for one should be very sorry to be deprived of the pleasures of looking backward in a certain sense. Because, sir, I think human nature is so constituted that in looking back upon our experiences, upon our troubles perhaps in the past, we forget the unpleasant features of any particular experience and our memory retains longest only those which are pleasant. Some of the happiest moments that I enjoy are when I have the opportunity of thinking over the experiences of the past, some of them quite unpleasant at the time, but softened and mellowed by the years that have elapsed since. They are a great source of pleasure to me now, and while, Mr. Toastmaster, I am sure that the members of this Association will look forward with the greatest pleasure of anticipation to the meet-in Detroit next year, or the following years perhaps in New Orleans and Old Point Comfort, I am sure they would be very loth to be deprived of the pleasure of looking back upon the three days that we have delightfully spent as the guests of the Northwestern Telephone Company of Minneapolis and St. Paul. (Applause).

Mr. Adams: We are gratified to notice a much larger attendance of ladies at this Convention than at any other previous meeting of the Association. We trust that the time is not far distant when they may be included

in its membership. (Applause.) I have the following toast:

"Women are made as they themselves would choose,
Too proud to ask, too humble to refuse."

I call upon Mr. W. H. Eustis to respond to "the ladies."

Mr. Eustis: I have been studying for a few moments upon the sentiment proposed by our eloquent toastmaster, and I am satisfied that he has got things mixed. He was thinking "man is proud, he knew so much, and woman is humble she knows so little." The sentiment which he propounds I am sure should read like this:

"Man is made as woman chooses,
He must ask and she may refuse him."

I wondered why the party having in charge these exercises sought to go outside of your telephonic circle, and invited one of another fraternity to respond; but somehow or other, he has got into the class that friend McMichael and I belong to, telegraphers, and I fancy the reason why he has asked me to respond on this occasion is perhaps that Mr. McMichael and I are more accustomed to touch the keys that touch the heart of the fair. Now, ladies never think of sending a delicate message through a telephone, but they will send it over our wire. (Laughter.) I take exception to what the distinguished scientist, who represents the parent company, said. He thought he was called upon to speak for the American Bell. I assure him that it is my province to speak for the American belle. (Laughter).

It is a very proper thing that woman should be toasted on this occasion. It seems to me that in the spiritual, in the ethical world, woman is a telephone. There is a marked similarity between her in this respect and the telephone. In the first place woman is an invention. She came after man, and just at that moment when Adam was about to suicide from melancholia the Lord sent woman down to please him and amuse him, and by and by he found out instead of being a mere matter of amusement that she was much more useful than he was himself. And so the telephone came, and we looked upon it as a toy, and by and by it became a necessity. Commerce to-day would stand still without it. Now you remember—this gentleman who represents the American Bell—that one of the first things you did was to file your caveat to protect your rights. So when a man becomes interested in one of the fairest of American belles he becomes "engaged" or "files his caveat," and "serves notice" on all the rest of the fellows to "hands off." By and by the priest gives him his "patent" and then he thinks he is all right for life. And he is, providing he behaves himself and his fair companion does not take to the skies before he does. If she does, we notice these widowers do not stop the second time to file a caveat; they take out a patent right off. Thus you see a similarity between the telephone and woman.

I was interested in a discussion on the subject of the long-distance telephone, and in hearing about how in Boston they managed to hold a directors meeting with the Chair in New York and the Chairman in Boston, and how they would carry on their meeting and the secretary would record the Chairman as being present. The important thing was the voice; that being present they could hold a meeting. If the scientists keep on I do not know how soon they will tear down all of the older customs of men. I asked: "How far are you going with this—how about courtship? Is it going to do away with the old sofa?" (Laughter.) And they assured me one and all that it would not. So I made up my mind that they were human like the rest of us, and that perhaps they would leave some of these old pastimes. There is no doubt that they will let us alone in that respect. I do not see how it could be done, if the end of the wires are very far apart. I can appreciate the "short-distance telephone;" I believe in that. But when you get into the spiritual world, you will find there is a telephone there which responds without wires and without belles. I think it must have been a telephone of that sort in the mind of the poet when he said:

"Where thought leaps out to thought ere thought
can wed itself to speech."

I saw a statement the other day somewhere that by and by—you know invention is on your track and you do not know how long you will have a monopoly of the thing you have got—I saw it stated that the time was not far distant when instead of using wires we would use a ray of light, and they would put a telephone on each end of a sunbeam and would talk from city to city, and from continent to continent, and if they had intelligence in the stars I do not know where the end would be. Now, if they can use sunbeams and rays of light for telephonic communication, then why is not woman the veritable sunbeam of all our lives? Why is she not the perfect telephone? (Applause.)

I know, gentlemen, and I feel honored as I look over your bald heads (laughter). I feel honored to stand in the presence of so much scientific lore, but I feel a good deal more honored to meet with these ladies, because I remember—I do not remember—but I recall the fact that when we men were made nature was a very rough apprentice, but when she made woman she had become the skillful artisan, and in her we find so much of culture and refinement that it makes even science move.

Now there is another marked similarity between the telephone and woman and that is this: You speak into a telephone loud and harsh and you get a jarring sound, you misunderstand yourself; and so with woman; but speak low and tender and you get a perfect communication of soul.

So, gentlemen, on this auspicious occasion I propose you "woman;" woman the perfect telephone, the gift of the gods to man, on earth our best and our truest friend. We cannot help but love and adore her, and we would not if we could. (Loud applause.)

Mr. Adams: We are honored to-day by the presence of a gentleman from a distant land. We extend a hearty welcome to him, and trust that his visit to our country may be a great pleasure to himself and profit to those whom he may represent. I have the honor to introduce Mr. Gustav Wabner, of Berlin, the representative of the telephone interest in that city.

Mr. Wabner: Mr. Chairman, ladies and gentlemen: When I received the order of my department to go over to America, I hesitated to accept this honorable commission, considering the great difficulties a foreigner meets with when travelling in a country without mastering the language of that country. But in reality, I did not meet with any difficulty at all. I was kindly and with the utmost kindness received by every authority of every company, and by all private persons upon whom I called. It is a very happy chance for me to have arrived just in the month of September, and I am especially happy to have had the honor of being allowed to attend the proceedings of the annual meeting of the Telephone Exchange Association of this country. I did not only get full and exact information about many technical and business details interesting in my department, but I appreciate most that I have had the best opportunity possible to get a full and personal acquaintance with all the pioneers of the telephone, with all the leading men representing telephoning, as well in the technical as in the business branch. I think that this information shall be lasting, and even when I shall have left this country there will be a possibility for me to get answers, even when abroad, about the questions interesting to my department, even when I shall be at home. I am glad to be allowed to tell you of my hearty thanks for the great attentions I have received while in this country, and which shall be a kind remembrance when I shall have left this country. I promise you that I will tell everybody in Europe I meet, that America is not only the country of rapid progress, that it is also the home of hospitality, and I promise you to keep this country and all the persons I have the honor to know here in this house in my very best and everlasting remembrance. (Applause.)

Mr. Adams: Those who have read that remarkable book of Edward Bellamy's, "Looking Backward," in the year 2,000, may think some of the ideas in regard to electricity seem extravagant, but the rapid progress made in telephoning would indicate that the writer's statements will all be fulfilled long before that time and period have been reached. I have the pleasure now of introducing Mr. E. J. Hall, Jr., general manager of the long-distance telephone company. (Applause.)

Mr. Hall: Mr. President, we all appreciate the advantage of speaking face to face above all other methods of communicating thought because ideas are then conveyed in three ways—by the words, by the tone, and by the expression and the manner of the speaker. Until Bell invented the telephone only the first method was available—first by letter and later by the rapid letter—the telegram. It is perhaps fair to say that we obtain our impressions from all three of those things in equal proportions. I would not set bounds to the possibilities of inventive genius. Some day we may see as well as hear our distant friends when we communicate with them by the telephone. But Bell in addition to absolutely annihilating space and time in the transmission of words, also enables us to hear the tone in which the words are spoken, or rather we get that indefinable something (which for lack of a better name is called quality), which enables us to recognize at once the voice of our absent friends and to know them with absolute certainty. You all realize what the effect of tone in the speaking of a word is, because you can give a different inflection, for instance you can change the word no to mean yes. I imagine a great many have heard no which really meant yes, but when you see it in writing it only has a single meaning; it can have no other meaning. When it is spoken it may have any number of meanings. The invention of the telephone marked the beginning of a new era in the business methods and even in the social habits and customs of the world. As soon as the effect of this was understood measures were everywhere taken to ring this wonderful instrument into practical service.

I need waste no time in describing what progress in this has been made. We all know the story, but I do want to call attention to a part of it which is often overlooked by the public and perhaps not wholly appreciated even by ourselves. I would not say anything to detract one iota from the glory of Prof. Bell's invention, but when we speak of the telephone business, I say, in a sense which I am sure will not be misunderstood, that the original telephone invention represents but a very small part in that magnificent creation of brains and capital which has developed his brilliant conception and to-day places it at the service of the people of the United States. In the humble workshops, in the laboratories of scientific institutions, in offices, in our operating rooms, along our lines and in our telephone conventions, busy brains are ceaselessly at work to discover, develop and construct the complicated mechanism of the central office and the gigantic system of lines and cables, and to organize the forces by means of which all this may be set in operation when a subscriber rings his bell. For nearly ten years we have met each other as we have met in the Convention now so pleasantly closing. In all these meetings the single purpose has been to confer with each other for the improvement of our service. During those years we have constructed and over and over again reconstructed the apparatus and lines of our exchanges to keep pace with the progress of invention. To-day I believe that the long-distance service embodies every discovery in the art of telephony in the direction of perfect service. That the service is perfect I do not claim. I shall never consider it so until we transmit both words and quality as exactly as does the air which vibrates with the spoken word between speaker and listener standing face to face. Is that impossible? Who knows? We can and will strive to reach it. It may be that none of us living will see the day when the tones of the human voice will be transmitted by the telephone—no, not by the telephone but by the telephone system from one end of this country to the other—questions scientific, practical, financial, all are involved in the problem. I am often asked how far it is possible to talk. I don't know. I do know that we can talk and talk well over the longest line that we have ever built and that covers nearly 1,000 miles. The only difficulty that I see to-day is the way of the speedy introduction of long-distance lines, and the introduction of the long-distance metallic circuits and switches into all our local exchanges is the great cost of construction. It practically means to double the existing plant and in many cases to throw away very much all that is now in use. Now, gentlemen, I believe that the business men of this country want the best of everything and are willing to pay a fair price for it. This is the best method of communicating intelligence, and it will find its place as a new and important factor in the commercial world. (Applause).

Mr. Adams: We should find it difficult, with the many articles necessary to successfully operate a telephone exchange, if manufacturers were not ready to meet the demand. We have one with us here who represents a company whose contracts are widely known, Mr. J. M. Jackson, treasurer of the Western Electric Company.

Mr. Jackson: Mr. Toastmaster, ladies and gentlemen: My distinguished friend from New York said that he had had several hours' warning that he was to speak, and it made him somewhat unhappy. I can heartily sympathize with him because my friend, Mr. McKinstry, really spoiled my night's rest by telling me, just as I was going up to my room, that I was to be called on here this afternoon. I am no orator, as the gentleman who responded to the toast, "The Ladies," is, and I suffer also under this disadvantage of not having had the chance to acquire any popularity here to take the place of oratorical ability. I have been a sort of human graphophone, which does not have anything on the cylinder except these monotonous words, "Please remit, please remit" (laughter and applause), varied with the very uninteresting information that "We have large bills to meet," or "a big note to meet on the 15th," but I can truly say this that, however lacking in popularity I may be, the very prompt and the very cordial responses which the gentlemen of this Association have made to my appeals and the generosity with which they have relieved me, has made me everlastingly grateful to them, and made them exceedingly popular with me, however I may stand with them.

It has been said that corporations have no souls. That is a very large question on which we have not time to enter now, but this I am sure, that some corporations have hearts. I think when we recall the hospitality which has been extended to us during these three days with an unsparing hand by the Northwestern Telephone Exchange Company, and the genial men whom they have selected to dispense it, I think they shall all agree that the Northwestern Telephone Exchange Company is a corporation that has a heart. I think, also, when we remember how the American Bell Telephone Company has kept open house for us over at the West Hotel and sent a band of royal good fellows to keep that house open and see to it that no man went away empty—I think we shall all agree that the American Bell Telephone Company has a heart. If you will pardon me detaining you just a moment, I might say that the American Bell Telephone Company was scientific in its hospitality, as it is in all other things, for it was only the other day that I read in a physiology that a man can live a great deal longer without food than he can without water, and the Apollinaris which they dispensed there was most excellent. But I did not fully appreciate their loving care for our physical well being until I discovered last night that my good friend from Boston, Mr. Hayes, was a doctor, and I am sure that we all know so well his ability and energy that after that fact was announced we all felt perfectly comfortable, and were sure that we should return to our families in good health. Now, gentlemen, lastly, since I am asked to respond to the toast, the Western Electric Company, I beg to assure you that that corporation also has a heart full and running over with gratitude to the gentlemen of this Association for the confidence which they have extended to it in the past, and a heart stout with determination to do its utmost to retain, and deservedly retain, that confidence in the future. As has been well said whenever these discoveries are made, there must be a manufacturer to make the apparatus. We consider it a privilege, gentlemen, to be of service in that matter, and we pledge you that we will exert ourselves to the utmost to meet your needs. I thank you for your kind attention. (Applause.)

Mr. Adams: We have a wealth of talent here which is not only willing but able to keep this intellectual feast going from now until to-morrow morning at this time, but the passing hour admonishes me that all these things must be brought to a close, as many of you are to take the train to your several destinations.

The next speaker, therefore, will close these exercises. While we are inclined to be modest, yet the people of Lowell feel that they were as early in the telephone field as most any other part of the country. We have with us a gentleman who started in the telephone business as early as any man in this country, so far as operating and building an exchange is concerned, and I now have the pleasure, and consider it a great pleasure, to introduce the gentleman, old in the service but young in years, Mr. Charles J. Glidden, treasurer of the Erie Telephone Company, Lowell, Mass.

Mr. Glidden: Mr. Chairman, ladies and gentlemen: I want to take this opportunity in behalf of our party; and I think I express the sentiments of the entire eastern delegation, in thanking our worthy secretary, Gen. C. H. Barney and his assistants, in arranging for us the telephone train which brought us so quickly and quietly from New York to Minneapolis. I will simply thank you for your hearty response to our invitation, in holding the Convention at Minneapolis, and also in bringing so many ladies. I wish you God speed, and hope you may return safely to your homes, and that we may meet again at Detroit.

COMPANIES REPRESENTED AT THE TELEPHONE CONVENTION—ACTIVE MEMBERS.

American Telephone and Telegraph Co., New York.—E. J. Hall, Jr., A. S. Hibbard, Mellville Eggleston, Mr. Meany.

Bell Telephone Co., of Buffalo.—Ed. J. Hall, H. C. Palmer, Dr. J. N. Culbertson.

Bell Telephone Co., of Missouri.—A. O. Morgan.

Bell Telephone Co., of Philadelphia.—Dr. S. M. Plush.

Central District and Printing Telegraph Co., Pittsburgh.—Henry Metzger.

Central Pennsylvania Telephone and Supply Co., of Williamsport.—R. M. Bailey.

Central Union Telephone Co., Chicago.—F. G. Beach, J. E. Hockett.

Chicago Telephone Co.—C. H. Wilson.

City and Suburban Telegraph Association, Cincinnati.—Geo. N. Stone.

Central New York Telephone and Telegraph Co., Utica.—H. L. Storke.

Cumberland Telephone and Telegraph Co., Nashville, Tenn.—J. M. Brown.

Delaware and Atlantic Telephone and Telegraph Co., Philadelphia.—W. T. Westbrook.

Empire State Telephone and Telegraph Co., Auburn, N. Y.—H. L. Storke.

Erie Telephone and Telegraph Co., Lowell, Mass.—Levi Sprague, C. J. Glidden, Chas. E. Adams, Abner S. Adams, ex-Gov. J. A. Weston, J. P. McKinstry, A. C. Wheden.

(Continued on page 10.)

* * The electric railroad is fast approaching Saratoga Springs, N. Y.

* * The electric road at Macon, Ga., will be in running order in time for the State Fair.

* * The Daft storage battery car is successfully undergoing tests in the streets of Newark, N. J.

* * A majority of the property owners on Niagara street, Buffalo, have signed petitions for electric street cars.

* * The east side electric road, of Toledo, has received a temporary set back from a technicality in the council.

* * On the authority of Thomas Lowry, the electric railway will be put in on Fourth avenue, Minneapolis, Minn., before snow flies.

* * The street railway track is now complete between Troy and Albany, and horse cars will be run over it until the completion of the electric plant.

* * Utica, N. Y., shows an overwhelming public sentiment in favor of electric railways, and will undoubtedly be so provided within a few months.

* * It is now expected that both the South Broadway and University Park electric roads at Denver, Colo., will be in operation by Oct. 1, if not before.

* * It is announced that a $100,000 company is to locate at Akron, Ohio, to engage in the manufacture of the Loomis electric motor, the invention of Mr. Frank F. Loomis of that city.

* * A successful trial trip over the Quincy, Mass., electric road was recently made. Changes in the gates at the steam railroad crossing are necessary before the cars can be run to West Quincy.

* * The Omaha (Neb.) Street Railway Company, which will use the Sprague electric system, began stringing overhead wires last week. The line will be in active operation the latter part of this month.

* * The contract for building the Northeast Electric Railway Company's power house at Lexington and Kansas avenue, Kansas City, Mo., has been awarded to Redpath & Co. It will cost $5,000.

* * Mr. Edward D. Mathews is to exhibit a Julien storage car in Utica, N. Y., for the inspection of the city council, who are asked to defer granting any overhead franchises until thorough investigation of this system has been made.

* * The Jeffrey Manufacturing Company, of Columbus, O., has commenced work on the electrical mining machine for the Sterling Coal Company, of Cannelton, Pa., the estimated cost of which is $14,000. It will undercut 300 tons of coal per day at a saving of 10 cents per ton over old methods, and with but three inches of waste.

* * Information has reached us that Mr. Julien, of Brussels, the inventor of the well-known Julien system in operation on the Fourth avenue line, this city, has been awarded a gold medal at the Paris Exposition for his storage batteries. Mr. Julien, we believe, received the "Cross of Leopold" at Brussels in 1888 for the merit of his invention.

* * A representative of the Westinghouse Electric Company, of Pittsburgh, has been in Williamsport, Pa., making plans and specifications for the Williamsport Passenger Railway Company necessary for changing the road from a horse to an electric railway. The power is to be furnished from the new electric light plant which is to be soon built for supplying the city with arc lights.

(Continued from page 9.)

George Foster, Messrs. Wainring and Joyce.
Great Southern Telephone and Telegraph Co., New Orleans.—A. W. Crandell.
Hudson River Telephone Co., New York.—A. B. Uline.
Metropolitan Telephone and Telegraph Co., New York.—W. H. Eckert.
Missouri and Kansas Telephone Co., Kansas City.—W. W. Smith, C. W. McDaniel.
Michigan Telephone Co., Detroit.—F. A. Forbes, Jas. R. Dee.
Nebraska Telephone Co., Omaha.—Flemon Drake, L. H. Korty, J. J. Dickey, Mr. Yost.
New York and New Jersey, Brooklyn.—J. C. Clark, W. Dunlap Sargent.
New York and Pennsylvania, Elmira.—W. N. Eastabrook.
New England Telephone and Telegraph Co., Boston.—J. N. Keller, I. H. Farnham.
Ohio Valley Telephone Co., Louisville.—H. N. Gifford.
Pennsylvania Telephone Co., Harrisburg.—Joseph R. Davis.
Rocky Mountain Bell Telephone Co., Salt Lake City.—Mr. Wallace.
Southern Bell Telephone and Telegraph Co.—D. I. Carson, C. E. McCluer, J. D. Easterlin, W. J. Cole.
Southern Massachussets Telephone Co., New Bedford.—Samuel Ivers.
Southern New England Telephone Co., New Haven.—M. F. Tyler,

ASSOCIATE MEMBERS.

National Conduit Manufacturing Co., New York.—J. P. McQuaide.
Standard Electrical Works, Cincinnati.—E. V. Cherry.
Western Electric Co.—J. M. Jackson, H. B. Thayer, W. R. Patterson, J. J. Carty.

HONORARY MEMBERS.

American Bell Telephone Co., Boston.—A. O. Morgan, Thomas D. Lockwood, Thos. B. Doolittle, J. N. Brown, Geo. Albree, David B. Parker, W. A. Hovey, Frank B. Knight, H. S. Huidekoper, Geo. J. Hall, A. G. Fuller, H. V. Hayes.
Bell Telephone Co., Montreal.—C. F. Sise.
Bridgeport Brass Co.—H. D. Stanley.
W. A. Childs (law battery), New York.—M. M. Hayden
Chas. A. Cheever (Okonite wire), New York.—Geo. T. Manson.
A. G. Day (Kerite wire), New York.—E. B. McClees.
Geo. L. Wiley (Waring cables), New York.—Fred. Degenhardt, Chicago.

OTHER ATTENDANTS.

Cyrus O. Baker, Jr. (platinum importer), Newark.
C. F. Johnson, New York.
Frank C. Mason, Brooklyn.
Chas. W. Price, ELECTRICAL REVIEW, New York.
C. E. Stump, *Electrical World*, New York.
J. B. Taltavall, *Electric Age*, New York.
W. A. Kreidler, J. W. Dickinson, *Western Electrician*, Chicago.
Gustav Wabner, Berlin.
H. M. Haines, New York.
R. S. Hair, New York.
M. A. Knapp (Knapp Electrical Co.), Chicago.
C. H. Cone, Chicago.

*** Bell Telephone sold up to 240 in Boston last week, Judge Colt's decision imparting strength. It appears that Judge Colt sustains the demurrer of the Bell Telephone Company, and the government case will now be tried on the ground of fraud only. The Drawbaugh chestnut evidence cannot be admitted.

*** The new directory of the Central New York Telephone Company, which is now ready for distribution, shows a total of 2,349 subscribers, divided among the different exchanges as follows: Syracuse, 899; Utica, 698; Rome, 128; Watertown, 172; Oneida, 79; Ogdensburg, 57; Little Falls, 74; Oneonta, 26; Canastota, 22; Norwich, 17; Cooperstown, 80; Herkimer, 36; Carthage, 11; Ilion, 17; Canton, 16; Gouverneur, 19. In addition to this there are in the 11 counties in which the company operates 371 public toll stations. These figures show a considerable increase in the number of telephones in use, as in October, '88, the company had only 2,101 subscribers.

Underground Wires in Brooklyn.

BY J. C. REILLY.

This statement of underground construction in Brooklyn is submitted in continuation of the papers upon the same subject by Mr. Sargent, read at the conventions held in 1886, 1887 and 1888.

Our actual underground extensions during the past year have been limited to about half a mile of conduit, the duct length of which is $1\frac{6}{16}$ miles, and to placing $1\frac{7}{16}$ miles of cable. In connection with the underground system, however, we have placed upon the elevated railroad structures $3\frac{7}{16}$ miles of cable, with $5\frac{8}{16}$ miles of distributing duct, and connected through this duct 553 subscribers.

The completion of 17 miles of elevated railways throughout Brooklyn, upon which we have the right to place cables and wires, made any immediate extension of our underground conduits unnecessary.

Our present mileage of conduit, cables, etc., is as follows:

	UNDERGROUND.	ELEV. R. R.	TOTAL.
Miles of conduit....	15.8	5.3	21.1
" duct.....	100.1	5.3	105.4
" cable.....	24.3	13.7	38
" conductor.	2339.9	1294.7	3634.6
Mls. cond'r w'rking	1327.2	679.3	2006.5
No. subs. cont'd...	2002	553	2557
No. cables cont'd...	44	15	59

Our method of distribution from underground cables by means of terminal poles or house-top fixtures, have been modified to a great extent by the facilities offered by the elevated railway. The method of distribution from the elevated railway structures is as follows:

Terminating either an underground cable or a cable placed upon the structure itself at some convenient point on the road, we run rubber-covered wires from that point in a distributing box six inches square, which is placed along the footway between the tracks to the points opposite where it is desired to branch them off. The wires are then dropped through holes in the bottom of the box, run along the cross-girder of the road to the curb line, and jumped directly into the subscribers offices or to a branch pole line or house-top fixture. Where there is a group of subscribers in a block, it is the practice to branch a cable containing 10 to 25 conductors from the main cable on the road to a convenient point in the block, and distribute over house-tops from there.

We had decided to place some 30 miles of conference standard cable in our underground conduits and upon the elevated railroad structures during the year, but we were fortunate in perfecting and applying a very simple and effective method of transpositions, which enabled us to reduce our cable purchases one-half. This was foreshadowed by Mr. Sargent in the following paragraph, read at the Convention held at New York in September, 1888:

"The transition period between grounded and metallic circuit systems will be very troublesome and annoying, and may last for several years. It is our intention in ordering the type of cable just described to make provision in the manholes for joining the sections together by devices, which will enable the joints to be opened readily without cutting the cable and the pairs broken up in order to prevent cross-talk on grounded circuits; and, at the same time, allow of access to them for straightening them through when twisted metallic circuits are required. The necessity of getting at the joints in this way from time time, and the space required to accommodate connecting boxes, is another argument in favor of large and commodious manholes."

As the results obtained may interest the members, it might be well to state that four cables of the conference standard type—

Number 1—3,000′ Number 3—6,655′
Number 2—5,310′ Number 4—7,500′

—were connected up and in use by subscribers, the twin wire in each case being grounded. Requiring additional conductors to the points reached by the cables one and two, we attempted to use a number of the twin wires for subscribers. After one week's trial we were compelled to reach these points by other routes and cut out of the cables on account of complaint from subscribers of constant cross-talk. We then, during several succeeding Sundays, introduced transposition plates at splices from 500 to 700 feet apart, and connected the subscribers through, using the wires indiscriminately. Cables three and four were transposed in like manner, and we are using from 60 to 92 conductors in these cables for subscribers, and there is, even on the largest length, 7,500 feet (with 92 wires working), but very little cross-talk noticeable at any time. Other cables connected in the same way since February last give like results. In each cable a number of circuits are connected straight metallic to provide for trunks and metallic circuit subscribers.

The transpositions are made upon hard rubber plates three and a half inches wide by 17 long, fitted with spring contacts, and attached to a similar plate to which the conductors of the cable sections are connected, and the whole enclosed in a copper box. The lid of the box can be easily removed when it is desired to restore the pairs of the cable, which is done by substituting for the transposition plate another plate connected regularly in pairs.

Close observation of the creosoted conduit and the lead covered cables laid at various times since 1884, seems to prove that the destructive agent usually present in freshly creosoted wood disappears almost entirely after a few years.

A Western electric cable purchased in 1886 and placed in the 1884 conduit during 1887, over two years ago, shows but very slight trace of action on its surface at this date, while part of the same cable laid in the 1888 conduit shows quite a scale of carbonate of lead after one year's exposure. Parts of the same cable placed in other conduits about a year after their construction show but little damage on the surface.

A Western electric cable placed by the Metropolitan Company late in 1885 in a creosoted conduit between the Brooklyn central office and the Brooklyn Bridge, when examined a few days since, after three and a half years exposure, shows a slight crust of carbonate, principally on the upper part. A N. Y. & N. J. cable laid in the same conduit in 1886 is in the same condition. We do not anticipate the loss of either of these cables from the action of gases. To further test the effect of time and ventilation on creosoted wood we placed samples of the Western Electric and N. Y. and N. J. cables covered with the alloy of lead and tin in a box made of creosoted wood which had been in the yard for two years or more, and samples of same cables in a box made of creosoted wood which had been on hand about eight months. After being sealed up for three months the boxes were opened and the samples in the old wood box were found to have but infrequent patches of what is known chemically as phenolate, while the samples in the box made of the later lot of wood were thickly covered on the sides and top by phenolate. Either phenol, a volatile gas, or ascetic acid in combination with carbonic acid gas will reduce lead to carbonate of lead. There being no ascetic acid in the wood properly treated with dead oil or coal tar and the phenol escaping by evaporation and ventilation, the carbonic acid gas present will in all probability have no more effect on the lead covering than if the cables placed were in ducts of iron or other material. It would seem desirable, therefore, before placing creosoted conduits underground to expose them to the air or to artificial means for evaporating the phenol from the creosote, if the latter cannot be obtained free from it. There seems to be no doubt as to the durability of creosoted wood. Frequent examinations during the past five years show there is no decay of the wood or change of any kind to cause injury in placing or removing cables. Its economy, flexibility and safety strongly recommend its use for conduits.

Our examination of the cables in use seems to show that there is a difference in the alloy covering. The Western Electric cable, covered with the alloy of lead and tin placed January, 1885, in a conduit completed the previous month, is, to all appearances, in as good a condition as when first laid nearly five years ago. It will be remembered the cables covered with pure lead were destroyed and removed from this conduit.

A Western Electric cable supposed to be covered with the same alloy, purchased in 1886 and placed in the conduit in 1887 with cable referred to above, shows a slight trace of carbonate, while part of the same cable placed in a newly laid conduit is severely attacked as stated in remarks on conduits. The cable first referred to above is, in fact, the only one we have which can be said to show no action on its surface. We are now having chemical tests made on specimens of several cables to determine, if possible, the difference in their composition.

The practice of ventilating the conduits and manholes, as they are constructed, by lateral branches to poles and house tops, and to which we ascribe our freedom from explosions, has been extended considerably during the past year by placing three-inch iron pipes from manholes to the columns of the elevated railroad, which serve the double purpose of ducts and ventilators. The quantity of gas in conduits and manholes has been sensibly reduced, and in two instances where conduits entered central office basement, the odor of gas, which it seemed impossible to entirely exclude, disappeared entirely after the manholes outside were connected to the E. R. R. structure by a number of three-inch iron pipes. A large tube leading to a dead chimney at this office, in connection with pipes to elevated railroad near by, usually keeps the large tunnel through which the conduits enter the building pretty free from gas.

We believe ventilation of this kind is the easiest and best method of preventing the explosions in manholes occasionally reported from other cities. Experience confirms our belief that manholes should be made large and roomy.

Except the cables removed on account of destruction of the lead covering, we have had no special trouble with either cables or terminals, and the electrical condition of our cables remains practically as reported last year. All cables connected during this year give satisfactory results in insulation and capacity.

Telephone Salutations.

BY R M. BAILEY.

With the idea that successful telephone service depends on the aggregate of many small details, I have written the following with the hope that some one of the many practical persons among you may present a remedy for the points of defect noted.

It has been customary in all ages of the world, when persons meet, that salutations more or less elaborate and courteous be exchanged, and the peculiarities of different peoples in this respect have been a fruitful source from which many writers and lecturers have drawn.

On the advent of the telephone the want was immediately felt for some form of salutation which should have the effect of attracting the attention of the party at the distant station, so that conversation might readily pass between the telephone correspondents attempting it. Some bright genius suggested the word "hello," which, by the way, is not usually approved as a proper salutation in polite society, but which, for telephone purposes, was at once generally adopted, the word having the apparent faculty of being spoken over a circuit utterly incapable of transmitting any other word in the English language; and while the word *may* be one of all others most suitable for telephone purposes, its use has developed into most annoying abuse. With intelligent people, as well as with others not so intelligent, and with telephone experts, in a great measure, it is customary to stand at one end of a telephone line and by reiterating the word a great number of times in quick succession, entirely drown out the fellow's voice from the other end of the line and who, by going through a similar formula with energy and patience, frequently mixed with anathemas against the telephone, succeeds in slowly getting into actual conversation, while the fault lies entirely with the individuals and not with the innocent machine. What would be thought of a person entering an office or premises of any kind, knowing and seeing the proprietor there present, should he begin and persist in calling attention by repeating over and over again the word, "hello"?

In some mysterious manner, the human intelligence is capable, if the person chooses to exercise the faculty, of recognizing the presence or absence of his correspondent at the distant end of the line. Telegraph operators are familiar with this consciousness; and by the use of a little good judgment people may save themselves the wear and annoyance of "helloing" into the earth for some time before the other fellow is ready to respond.

"Good morning," or some similar salutation should be more agreeable, and it being more deliberate has the advantage of giving the opportunity for a reply to flow over the wire without interruption, and if the conditions referred to are observed, should be ample to start two reasonable people into prompt conversation, taking into consideration the general high state of efficiency in which telephone lines and apparatus are at this time maintained.

It is really wonderful how easy and pleasant an undertaking it is to converse over a properly conducted telephone line, and it is wonderful the amount of vexation one can cause for oneself, if they persist in the manner before referred to. Some people are strongly averse to the use of a telephone for no other reason than want of judgment and training in its manipulation. It may be said such difficulty is the result of habit superinduced by inferior telephone service in the past and want of familarity with its operation, so that all such subscribers are compelled to first test out their lines before proceeding with the business in hand. I think such causes, at this time, rarely exist, and may not the habit be broken by some improvement in the system and by courteous and careful schooling to the end that more rapid, pleasant and agreeable service be secured, to the happiness of the custo ner and employé as well. Certainly much more time is used in worthless preliminaries than in the actual service. Some rule introductory is badly needed in the operation of the telephone. Sometimes subscribers call up a central office and inquire who called them or who it was who was talking to them a little while since, and then think it singular that the operator, in the multiplicity of her calls, should be unable to give the desired information. Again, a person calling for another is naturally desirous of being assured that he is speaking to the person he has asked for, and a person called up is naturally reluctant in answering an inquiry until one or both are satisfied of the identity of the other. All this leads to questioning on both sides and much valuable time is thus consumed. Would it not be a good plan for each of the correspondents to announce his name or the name of the firm as the only preliminary, thus abandoning both "hello" and "who is talking?" Would not self-introductions obviate this?

The rapidly repeated ringing of call bells, although not properly coming under the head of telephone salutations, may as well be considered in this connection, and is certainly an evil of the service which should be abated, it being worse than useless in that it, like steam whistles when much indulged in, breeds contempt and carelessness as to prompt replies or observance. Switchboard operators should be prohibited from calling more than three times, spacing the calls sufficiently to allow the subscriber to arise from his chair and reach his telephone; while subscribers should have it pressed upon them unceasingly, when so addicted, that rapidly repeated calls is a hindrance to prompt service.

Dynamo Alternating Current Interference with Telephone System in New Orleans, La.

BY E. H. M'FALL, ELECTRICIAN OF THE GREAT SOUTHERN TELEPHONE COMPANY, NEW ORLEANS.

This was read by Mr. Crandall at the Telephone Convention Wednesday morning.

This paper is intended to suggest to the practical ideas in this Convention, some of the interferences set up by alternating currents.

I will first give the relative positions of the respective routes in question.

The telephone route in illustration, is one with which we are having the maximum amount of trouble, and that is paralleled by the Electric Company's main route (alternating) on opposite sides of the same street, and carrying six circuits to a considerable distance of parallelism, and at the immediate head, eight circuits of 1,000 volts each. The extreme distance of parallelism is 6,600 feet, with a separation of 43 feet or width of street intervening from pole to pole of systems, the telephone poles being the highest, having an elevation at the lowest wire of about uniformly 10 feet above the electric light wires.

When the first alternating current was put in operation along this route, a decided hum, and a musical note, were heard in all of the telephone lines in this parallel distribution. This hum was of sufficient volume to make an attempt to carry on a telephonic conversation on any of these lines extremely difficult and doubtful. By the time the subscribers became accustomed to this disturbance, the second circuit was put in operation, and another and so on until six were in full blast. The humming sound then ceased to be musical and assumed proportions of an undulatory wave impenetrability to the deflections of the transmitter, and at times would swell in volume and graduate to a uniformity of disturbance about equal to that set up by the first circuit. This does not occur, however, at regular intervals, and becomes noticeable visually, in the increase and decrease of the incandescent light service through this system, showing that the currents were interfering with each other.

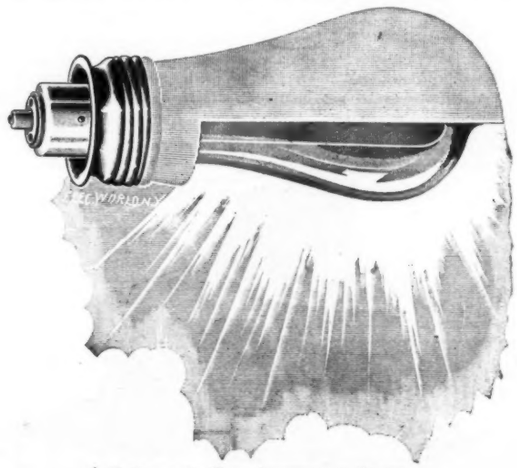
To the electric light companies, this interference became a serious question, and to a great extent was remedied by placing the wires of each respective circuit nearer each other and farther from other circuits. To the telephone subscribers and exchange, the hum is still there, strong and vigorous as ever.

On this route, we, the telephone company, tried the return ground, covering the field of interference, but not entirely back to the exchange. The ground was located at a neutral point and gave some considerable relief, but not entirely, to the subscribers connected.

It is doubtful if another licensee has been subjected to the same extent of interference, and the physical facts afflicting us as above are presented to your attention for such discussion and opinions, I trust, that will direct to a remedy other than compromise.

Improvement in Electric Light Shades.

Mr. A. A. McCreary, of New York, has been engaged in the manufacture of incandescent lamp shades for a long time, and out of his experience and inventive ability has wrought many improvements. The field of ornamentation is large with the incandescent light, and Mr. McCreary has evidently worked with an eye to both beauty and utility. His shades are now in such general use that their value is thoroughly known. His newest work is shown in the large illustration. The shade is adjustable for use in connection with all classes of electric lamps by means of a screen made of any variety of opaque or translucent material, and of such shape that it will fit closely over the globe or glass used upon the lamp. It may be made of any desirable material, according to the purpose for which it is used, and owing to the fact that it conforms so closely to the shape of the globe as to become practically an outer covering for the same. The shades may be fitted to any of the ordinary forms of incandescent or arc lamps.



McCREARY'S NEW ADJUSTABLE SHADE.

Proposals for Lighting.

For Bids.—The following are the specifications for the new electric light apparatus at Chicago:

Sealed proposals will be received at the office of the Fire Marshal until 12 M., September 20, 1889, for furnishing the city of Chicago with electrical apparatus for 500 (more or less) electric arc lights of nominal 2,600 candle power.

Specifications.—Bidders for electric light apparatus must state number of lights per dynamo and price of dynamo and price of each double carbon lamp, price to include delivery at stations of the city of Chicago as may be required.

Bidders must state specifically attachments furnished with each dynamo, and length of time which would be required to complete and deliver apparatus for 500 arc lights.

Bidders to state current in *amperes* and number of *volts* per lamp, and energy in *watts* absorbed in dynamo.

State whether or not automatic regulator is included, and, if so, state maximum variation of current strength under constant load and varying load.

With bids include drawing or cut of dynamo and of lamp.

In addition bidders must state any special features or merits claimed for their apparatus.

Bidders, if required, to furnish before contract is awarded a dynamo, with its complement of lamps, to be run experimentally and tested by the city, with permission to any bidder to be represented at tests of his own apparatus.

All bids must be accompanied with $500 in money or certified check on some responsible bank doing business in the city of Chicago and made payable to the Fire Marshal.

Bids to be addressed to the Fire Marshal and endorsed "Proposals for Electric Light Apparatus."

The Fire Marshal reserves the right to reject any or all bids if deemed for the best interests of the city.

ELECTRIC LIGHT NEWS

—— The Kennebec Light and Heat Company, of Augusta, Maine, has arranged to increase its capacity, by ordering another 45 arc light plant of the Brush system.

—— The central station for arc lighting in the city of Mexico is growing to large dimensions. The Brush Electric Company has just sent out complete machinery for an increase of 200 arc lights there.

—— The Denver Consolidated Electric Company, of Denver, Colo., is increasing its arc lighting plant, and has just ordered Brush dynamos, lamps, etc., for an additional capacity of 195 2,000 candle power lights.

—— The Brush Electric Company announces the sale, in the last few weeks, of 11 alternating current central station plants aggregating 8,600 lights. The merits of the new Brush system, recently described in these columns, are evidently appreciated by the public.

—— Mr. Leslie Robinson, president of the Peoria, Ill., Electric Light Co., has taken matters into his own hands with the result that an entire new plant will be put in there. A building 74 by 100 feet will be erected and Thomson-Houston dynamos installed. Over 500 steam engine horse-power will be required.

—— The Ball Electric Light Company's system has received a notable endorsement from the Providence, R. I., Worsted Mills, which now uses a total of 530 lights. In 1885, 95 Ball lamps were put into these mills; in 1887, 100 more, and in 1888, 35 more were added. During last month 300 additional lights were ordered.

—— A new dynamo for 50 lights has been placed in the electric light works at Rochester, N. Y., to take the place of the 30-light dynamo. A new engine of 113 horse-power will be put in place in about three weeks, to be used in addition to the present engine of 100 horse-power. A dynamo will also shortly be placed for lighting the normal school and private residences

—— Workmen are engaged in preparing the foundation for a two-story brick building for the Brush Electric Light Company, at the foot of the Lower Falls, Rochester, N. Y. It will be built into the bank on the east side and will have facilities for introducing steam machinery of 2,000 horse-power. The foundation will be built of solid concrete, upon which the walls of the building will be placed. The walls on the river side will be four feet thick.

—— Under the superintendence of T. J. Bray, formerly of Pittsburgh, reconstruction of the old plant and the addition of new structures and machinery to the extent of $100,000 are being rushed by a big force of men at the Page Tube Works, Pittsburgh, Pa., which are expected to be in full operation by October 1. The Board of the City Council are observing the Pittsburgh electric light system with a view of putting such in here. The Westinghouse people are thought to have a successful bid in.

—— The Municipal plant of the Brush system, operated by the city of Danvers, Mass., continues to give the best satisfaction. 1,200 candle-power arc lamps are used. Recently the city had engineering experts measure the power required for the lights, and it appears that they are operated with the expenditure of a little less than $\frac{1}{6}$ of a horse-power per lamp. The lighting committee in its report expresses the greatest satisfaction of this showing of economy and the generally satisfactory working of the apparatus.

KINDRED INTERESTS

The N. Y. Belting and Packing Company has gotten out a convenient letter opener for office use. On one side of the handle appears the name and address of the company, while the reverse bears a list of the well-known specialties which the company handles in such large quantities.

The Empire City Electric Company are meeting with much success in the introduction of their many new and improved devices for electric light construction work. Mr. Henry D. Hall, of that company, has just shown us their latest style of the "Stoddard" pendant cut-out; it is very compact, and also well finished.

The Electrical Supply Company, of Chicago and Ansonia, Ct., permits no opportunity to go by of keeping its many friends and customers supplied with information as to its various specialties. This week there comes to hand a new and tasteful price list of insulated wires, including the Shield Brand, "P. & B.," Cobb Vulcanite, and Okonite wires. With these lists are published useful gauge dimensions and resistance tables.

Brownlee & Co., of Detroit, the old established manufacturers of and dealers in railway and telegraph supplies, are making quite a specialty of octagonal pine poles for electric street railways and lighting. The poles are strong and durable, and from being nearly equal in appearance to iron poles, meet with but little if any opposition from property owners. The cost of the poles is but a fraction of what is paid for those of iron. The firm is doing a large business in these poles, and also in its old established lines.

The Energy Manufacturing Company, of Philadelphia, has issued an attractive price-list of its improved portable rope hoisting machines, including hatchway hoists, elevator gearing, outrigger hoists, drill guides and steady rests, adjustable clamping blocks, friction driven grinders, etc. The hoisting machines of this company are not simply self-sustaining tackle blocks, but first-class lifting machines made and proportioned so that one man can lift the full capacity the machine is built to raise. The company is prepared to do work to fill special wants and will pay immediate attention to all inquiries.

The Brush Electric Company during the past month have received the following orders from parties increasing their present arc plants: The Cambria Iron Co., 40 arc lights and dynamo; Scranton Electric Light Co., Scranton, Pa., 65 arc lights and dynamo; West Winsted Gas Co., West Winsted, Conn., 15 arc lights; Allegheny County Light Co., Pittsburgh, Pa., 65 arc lights and dynamo; Brush Electric Light Co., Detroit, 46 arc lights; Union Stock Yards, Chicago, Ill., 15 arc lights; Albany Electric Illuminating Co., Albany, N. Y., 95 arc lights and dynamo; Olean Electric Light and Power Co, Olean, N. Y.; Lapham Woolen Mills, Millbury, Mass., 45 arc lights and dynamo; Consolidated Electric Co., Denver, Col.: Brush Electric Light Co., Rochester, N. Y.; Fort Madison Electric Light Co., Fort Madison, Ia.; Brush Electric Light and Power Co., Galveston, Tex.; Minneapolis Brush Electric Co., Minneapolis, Minn.; Brush Electric Light and Power Co., Indianapolis, Ind.; Menominee Electric Light Co., Menominee, Mich.: New York Mills, No. 1, Oneida Co., N. Y.; St. Stephen Electric Light Co., Calais, Me.; Burlington Gas Light Co., Burlington, Vt.; Passaic Rolling Mill Co., Paterson, N. J., 15 lights; Kennebec Light and Heat Co., Portland, Me., 45 arc lights and dynamo; Bigelow Carpet Co., Clinton, Mass.; Quaker City Dye Works, Philadelphia, Pa., 15 arc lights.

A Substantial Rail Chair.

The accompanying illustration shows the R. T. White single chair for T-rail construction. The chairs are cast as shown, with a strengthening rib under the rail; the clip is made of wrought iron with the lower end bent the same as the end at the top. When the bolt is screwed up, the clip, being bevelled at each end, draws the rail solidly to the chair. The joints of rails are supported by a similar chair of about double the width, with two clips and fish plates.

The advantages of this construction as being both strong and economical, are being recognized by street railway contractors, and Mr. White, whose main office is in Boston, is now filling an order for 10,000 chairs, which are being used on the Thomson-Houston electric road between Attleboro and North Attleboro, Mass.

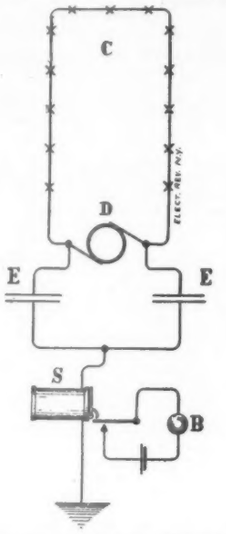
A New Steam Engine.

A new engine, for both marine and stationary purposes, has just been put on the market. It is an upright duplex high speed engine making anywhere from 1,500 to 3,000 revolutions per minute, and instantly reversible. Mr. Charles G. Emery, of New York City, tried the first engine, that was built, in his steam launch. Its performance was so satisfactory that he has taken up the manufacture of it.

The Ames Manufacturing Company, of Chicopee, Mass., are making them, and the Hussey Re-Heater and Steam Plant Improvement Company, 15 Cortlandt street, have taken the general agency for their sale throughout the United States, Canada and Mexico. The inventor of the engine, E. G. Shortt, of Carthage, N. Y., has also invented an upright duplex steam pump, which embraces principles similar to the engine, which will shortly be put on the market by the Hussey Company.

Rudd's Testing Combination.

In Rudd's arc light testing system, which is shown herewith, a condenser effect is depended upon for desired results. It is very simple, *C* represents an arc light circuit, in which *D* is the generator. *E* and *E'* are two condensers, the plates of which are connected on the one side to the poles of the dynamo, the opposite sides being united through a relay *S* to ground. When this relay opens



from any cause the armature closes a second circuit, as shown, and rings the bell *B*.

Very little is necessary by way of explanation. The plant, when in a condition of proper insulation, holds the two sides of the condenser perfectly balanced. Now, if a ground comes on the line *C* at any point outside the exact electrical center of the line the balance is disturbed, the condenser discharged, the relay opens, and the bell in the secondary circuit rings the alarm.

The combination is simple, effective and certain in action. The Western Electric Company, of Chicago, is manufacturing and controlling the apparatus.

THE R. T. WHITE SINGLE CHAIR FOR T-RAIL CONSTRUCTION.

The Butte (Mont.) Electric Light Company, John A. Tupper, manager, receives the following lighting rates:

Lamps 16 candle power:

Until 10 o'clock	$1 50 per month each.
Until 12 o'clock	2 00 per month each.
All-night lamps	2 50 per month each.
Lamp renewals	75 each, 16-c. power.
Installing lamps	1 00 per light, including wiring, flexible cords, fixtures and lamps connected ready to burn.

RATES FOR ARC LIGHTING.

Arc lamps 2,000-candle power:

Until 10 o'clock	$0 50 per night.
Until 12 o'clock	75 per night.
All night	1 00 per night.

The National Carbon Company, of Cleveland, O., has just gotten out a new edition of its almost indispensible publication, "The Directory of Electric Arc Lighting Plants in North America." This latest issue not only corrects any errors or omissions which may have occurred in its predecessors, but is a complete and accurate record of plants established up to date, and shows a gratifying increase in this important branch of the electrical industry. The National Carbon Company deserves great praise for its enterprise in getting out this publication which has become an important book of reference for every electrical office desk, and is entitled to the hearty co-operation of all arc lighting companies in adding to the correctness and completeness of the book.

Live Volts and Amperes by Mail.

Probably one of the first transportations of live volts and amperes ready for immediate use through the United States mails was made last week, when a new form of Crowdus dry battery know as the "Baby" was received at this office from the Electric Fare Box Company, of Nashville, Tenn., of which Mr. W. A. Crowdus is general manager. The cell is believed to be the smallest ever commercially manufactured, its dimensions being 3 inches in length by 1½ inches square, and has an E. M. F. of 2.1 volts, with an internal resistance of 1 ohm. It is designed as a substitute for liquid cells in testing cases and portable outfits, and when exhausted can be recharged by connecting in opposition with a current of 3 or 4 volts and small quantities.

The Kansas Electric Company, of Topeka, Kan., has been granted the contract for wiring the east and west wings of the State House for $3,898.75, and the contract for lighting was let to the Edison Company.

ELECTRICAL PATENTS

INDEX OF INVENTIONS FOR WHICH LETTERS PATENTS OF THE UNITED STATES WERE GRANTED IN THE WEEK ENDING SEPT. 10, 1889.

410,586 Electric lighting of railway cars; Theodore M. Foote, Boston, Mass.

410,592 Armature; Josef R. Johnson, Yonkers, N. Y.

410,626 Structure for supporting lamps above streets; John S. Adams, Indianapolis, Ind., assignor to the Jenney Electric Company, same place.

410,637 Insulator; William M. Davis, Plymouth, Mass.

410,656 Method of determining the shape of pole-pieces for dynamos; John G. Slatter, London, Eng.

410,663 Regulator for dynamo-electric machines; Julien M. Bradford, Portland, Me.

410,670 Brush-holder for dynamo-electric machines; Chas. D. Jenney, Indianapolis, Ind., assignor to the Thomson-Houston Electric Company, of Connecticut.

410,683 Burglar-alarm; Edwin M. Carhart, Providence, R. I.

410,689. Electric light fixture; John C. Hollings, Boston, Mass.

410,700 Cable sheave and hanger for cable tramways; Harry C. Simpson, Brooklyn, N. Y., and Albert Waggoner, Columbus, Ohio.

410,786 Electric registering deep-sea sounder; Alfred J. Cooper, and Eustace E. Wigzell, London, Eng.

410,791 Acoustic telephone; Larkin V. Elliott, Mooresville, Ind.

410,871 Electric and cable railway cars; Sumner A. Bemis, Springfield, and Louis Pfingst, Boston, Mass.

410,876 Process of separating magnetic from non-magnetic particles; Gurdon Conkling, Glen Falls, N. Y.

410,877 Magnetic separator; Gurdon Conkling, Glen Falls, N. Y.

410,896 Commutator-brush for dynamo-electric machines or motors; Rudolf Hoffmann, Zurich, assignor to the Maschinenfabrik, Oerlikon, near Zurich, Switzerland.

410,953 Air-tight covering for electric cables; David Brooks, Jr., Philadelphia, Pa., assignor to the Electric Cable Construction and Maintenance Company, same place.

410,964 Magneto electric machine; Arden S. Fitch, New York, N. Y.

410,965 Magneto-electric machine; Arden S. Fitch, New York, N. Y.

410,966 Magneto-electric machine; Arden S. Fitch, New York, N. Y.

410,987 Dynamo-electric machine on motor; Francis J. Patten, New York, N. Y.

410,988 Method of operating electric motors; Francis J. Patten, New York, N. Y.

$1,000 REWARD.

I WILL PAY $500 for information sufficient to effect the discovery and conviction of the thief who broke open my desk at my office and stole therefrom papers and documents, alleged copies of some of which were published in the New York *Sun* of August 25, 1889. I will also pay $500 additional for the return of the stolen property.

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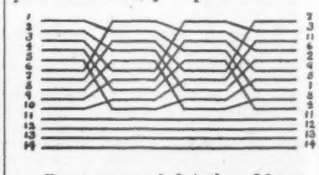

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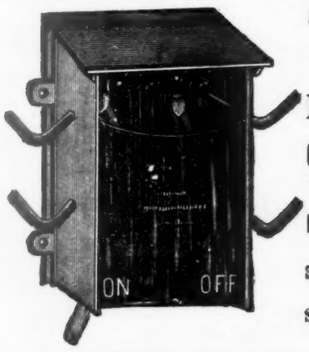

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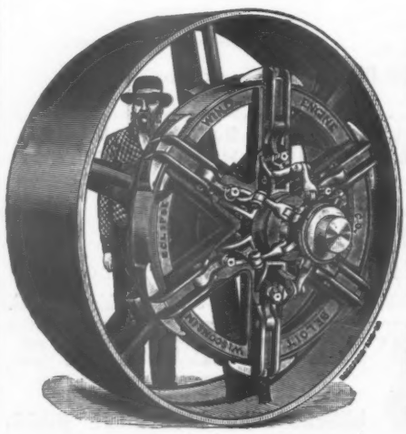

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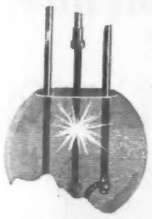

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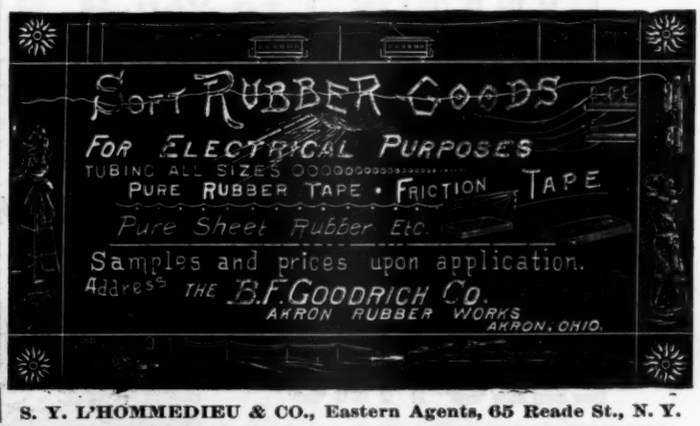

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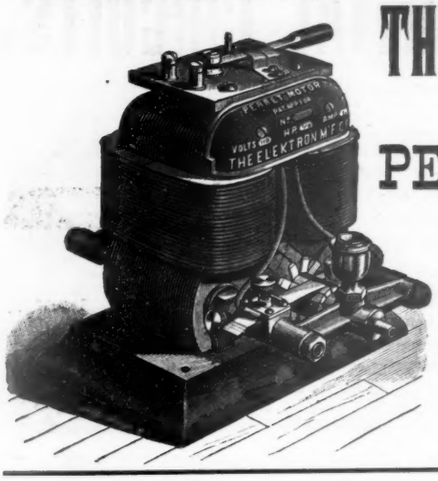

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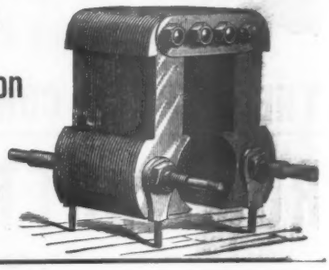

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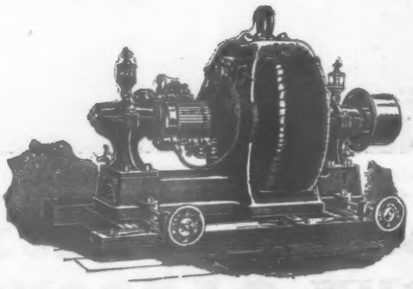

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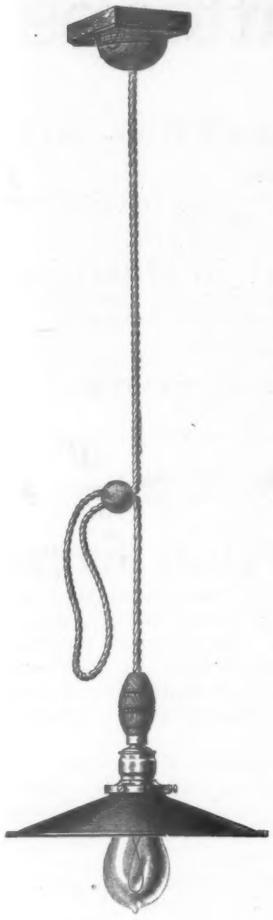

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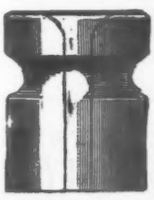

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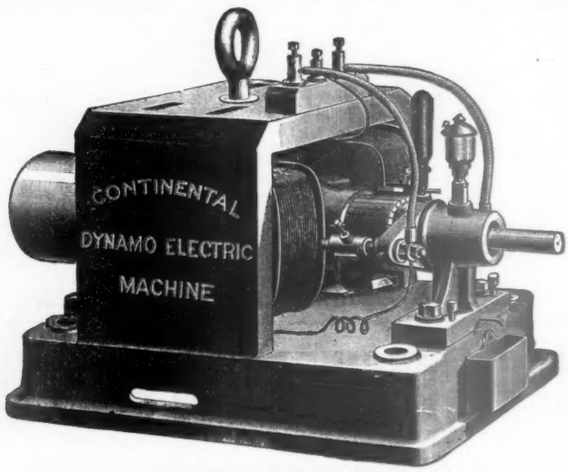

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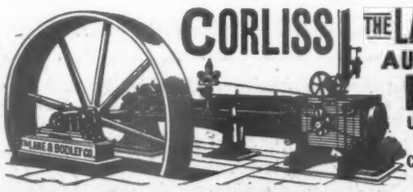

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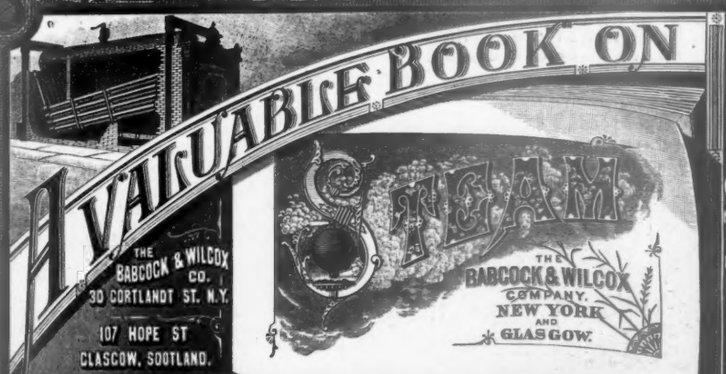

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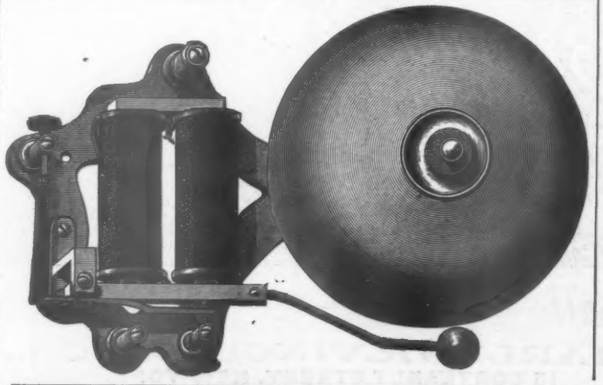

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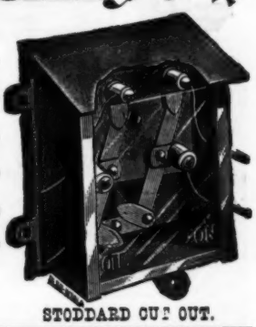
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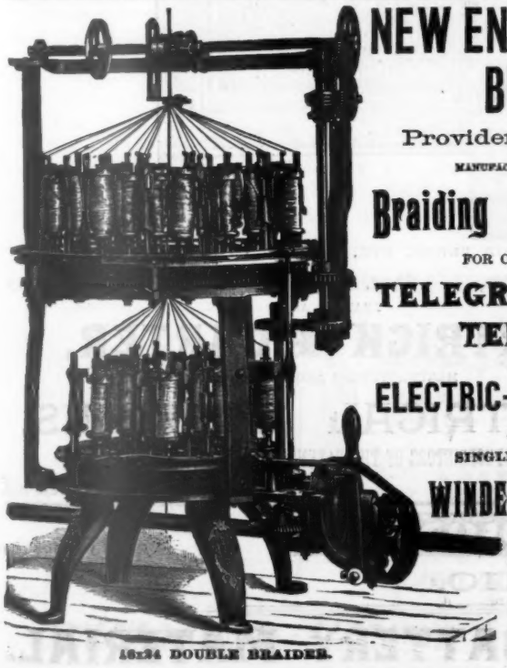
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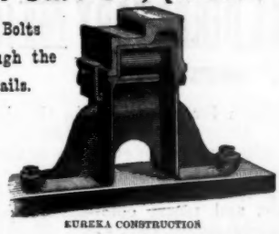
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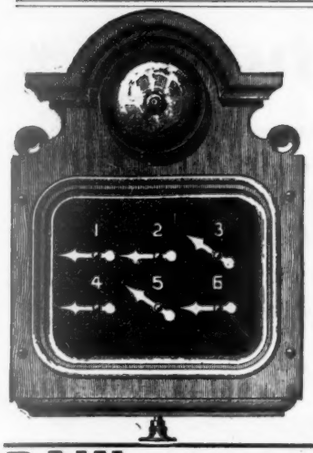

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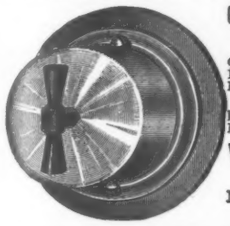

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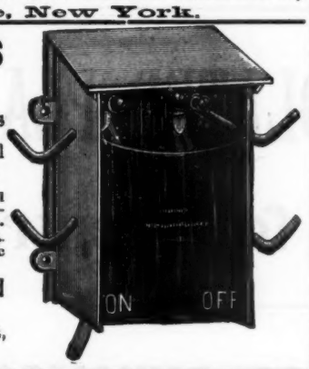

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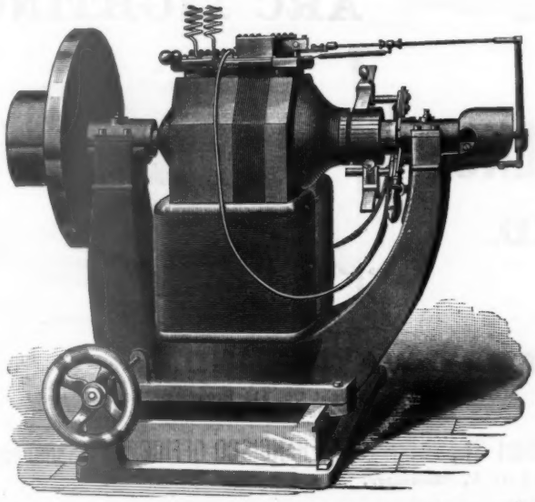

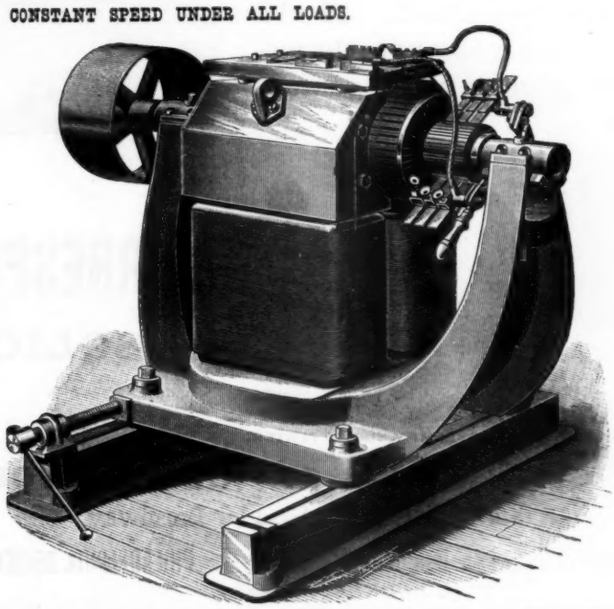

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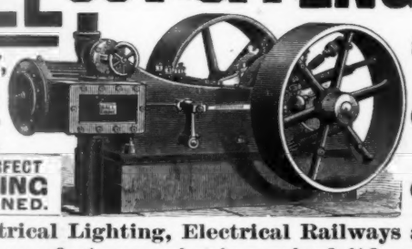

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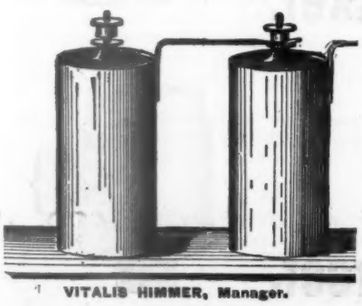

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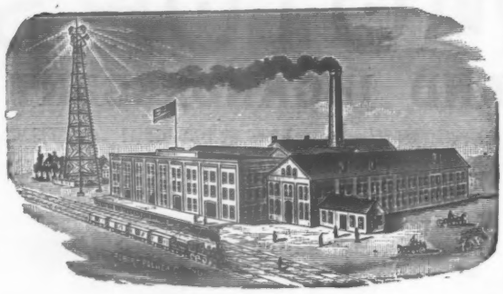

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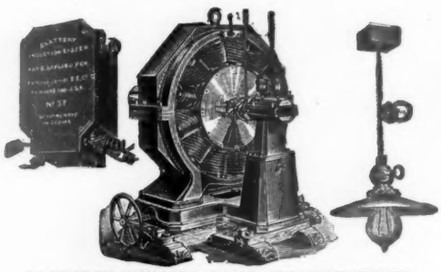

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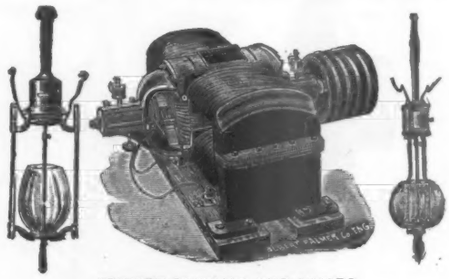

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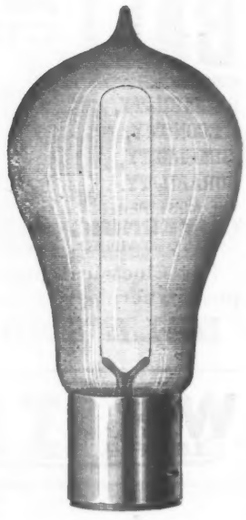

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